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THIS JOURNAL *is non-political and seeks only to further the pursuit of knowledge. Its main purpose is to communicate to scholars abroad the results of scientific investigations of the Near East as carried out in Israel. But as fruitful work can be accomplished only by reciprocal endeavour, papers from contributors in other countries will be gladly considered. The subjects to be dealt with include the history, archaeology and culture of the countries of the Near East, as well as their geography and natural features.—The Editors are not responsible for the opinions expressed by contributors.*

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Israel Exploration Journal

VOLUME 2 NUMBER 4 1952

Ecological Studies in the Vegetation of the Near Eastern Deserts*

I – Environment and Vegetation Classes

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INTRODUCTORY

IT IS the purpose of this paper to review in brief the results of the investigations on the vegetation of the deserts adjacent to the Eastern Mediterranean region. These deserts, though belonging to two phytogeographical regions, the Irano-Turanian and the Saharo-Sindian, constitute a continuous and physiognomically uniform entity, which is separated from the Central Asian deserts by the great Iranian mountain barriers whereas it is much more open to those of North Africa.

Unlike the Middle and Central Asian deserts, which have been botanically fairly well explored, notably by scholars of the USSR, the vegetation of the area under review has been very poorly studied. It is only recently that a few publications on the vegetation of some of the countries situated within this area have been published. These and other data collected by the author in a series of botanical journeys in the region concerned, have enabled us to outline in the present article the most prominent geo-botanical features of the area.

*This paper opens a series of ecological and plant-geographical studies on the deserts of the Near East to be published by the author and his collaborators.

LOCATION AND TOPOGRAPHY

The area under review comprises a vast trapezoid limited on the west by the Syro-Palestine mountain system and including in the south-west the Sinai Peninsula. It reaches the Kurdistan—Zagros Mountains in the east and the Taurus—Antitaurus bar in the north. In the south the limits are less natural, viz. a line drawn from the Gulf of Suez to the Gulf of Persia. In broad lines the area may be looked at as a table-land, gently sloping from W to E and from N to S, reaching sea-level at the gulfs. The main hydrographic features of the area are the great rift valley extending from the Valley of the Orontes in Syria to the Zambezi in Africa, and the Mesopotamian Valley of the Euphrates and the Tigris. While these hydrographic systems are situated at the edges of the area, its bulk is constituted by an extremely arid region characterized by ephemeral wadis. Besides, the area displays a series of local depressions such as the Dead Sea and the Araba, Wadis Sirhan, Jauf, Jaafar ,etc., as well as local elevations, such as the Jebel Druze, the Mountains of Edom, the Sinai complex, the Isthmus ranges, the eastern branches of the Antilebanon, etc.

CLIMATE

The climate of the area is an extreme variety of the Mediterranean type. The winter is mild to fairly cold but short and rainy, while the summer is long, dry and hot. In contrast to the Central Asian climate the mean monthly temperature seldom drops below 0°C.

The following figures for the temperatures in the coldest (January) and the hottest (August) months of the year have been selected for a few localities situated near the four corners and in the centre of the area (all according to Ashbel 1946 and 1951).

Locality	Alt. in m.	Temperature in °C				Annual rainfall in mm.	
		January		*August*			
		Mean Max.	Mean Min.	Mean Max.	Mean Min.		
Qal'at en-Nakhl (Sinai)	438	16.1	0.7	34.9	16.0	22.1	(1918-21; 1940-41)
Baghdad	34	15.5	4.9	42.2	24.9	127.2	(1937-44)
Mosul	250	11.8	0.9	42.9	20.9	338.2	(1935-44)
Aleppo	380	9.8	1.9	35.9	20.4	393	(1938-44)
Palmyra	400	12.7	1.8	38.3	20.9	134	(1933-43)
Jericho	−260	20.0	9.8	39.1	24.5	139	(1927-38; 1939-44)

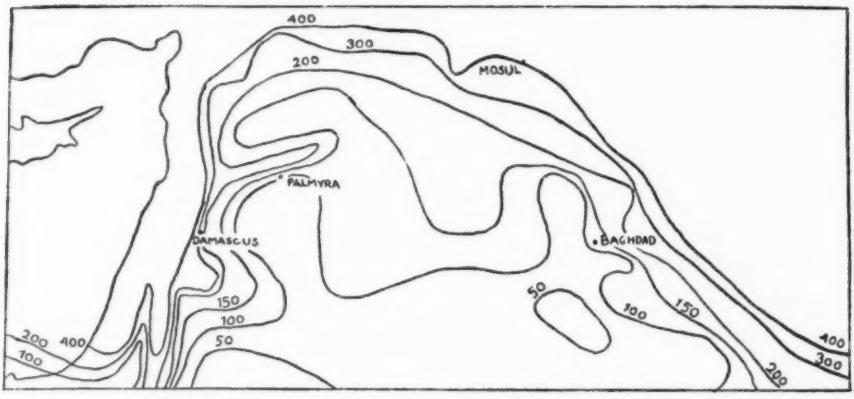

Fig. 1. Rainfall sketch map of the Near East deserts (after Ashbel, 1951).

The above figures may suffice to demonstrate the general climatic character of the region. It is mainly altitude which gives such prominence to the difference in the minimum temperature of the winter. Jericho with its mildest winters is situated in a depression of -260 m., while Nakhl with its coldest winter is at least 700 m. higher than Jericho. Such differences also occur in the summer temperature but to a lesser degree. From the biogeographical point of view the minimum figures of January are the most important. While Jericho still harbours a type of Sudanese savannah vegetation and permits the cultivation of certain Mediterranean and subtropical trees under irrigation (Pinus halepensis, Cupressus sempervirens, Olea europaea, etc.), Palmyra, an oasis situated in the midst of the Syrian desert, has rather cold winters very unfavourable for both the Mediterranean and the subtropical species. Annual precipitation is a factor much more decisive in plant life. It ranges in the area under review from about 400 mm. to 22 mm. Generally the amount decreases from N to S and from W to E. While the bulk (about 80%) of the area is situated between the isohyetes of 200 mm. and 50 mm., there is a circular belt bordering the northern, western and eastern limits, in which the precipitation ranges from 200-400 mm. The sketch-map (Fig. 1), drawn after Ashbel (1951), may serve to demonstrate the amounts of rain in the various parts of the area.

The following remarks may be added on the effects of the amount of rainfall on vegetation:

(1) The lower limit of rainfall beyond which vegetation cannot be maintained except in depressions which enjoy additional moisture coming from run-off, is

in this region about 50 mm., varying with the distance from the sea (humidity of the air). It is one of the great puzzles of plant life in these deserts that vegetation exists on hill-tops which do not receive more than 50 mm. of rain, about one half of which is lost by run-off.

(2) The yearly means of rainfall do not properly indicate the conditions prevailing in years of extreme rain minima, which may have only $^1/_3$ to $^1/_5$ of the calculated mean. In such years the annual vegetation may be entirely absent, while the perennial plants although not fully developed are still active even during the dry season.

(3) Experience has shown that at certain depths of the soil an amount of moisture is permanently preserved which is probably sufficient to maintain plant-life even in years of extreme drought.

SOILS

The factor second in importance to rain is the type of soil. The soils of the deserts have generally been underestimated as to their ecological value, and the term 'desert soils' as commonly met with in literature for a certain typological unit is a too general one. Close examination has revealed that a variety of edaphic units must be distinguished within the broad concept of desert soils. True, soil formation and development under desert conditions display special pecularities; however the individual soil varieties may greatly differ from one another in constitution and properties. It is these differences, sometimes rather inconspicuous, which introduce a great deal of diversity found in desert vegetation, despite the rather uniform climatic conditions. The term *soil* must therefore be broadly understood here to include all kinds of terrestrial substrata, such as rocks, hammadas, shifting dunes, etc. which characterize the desert and support desert plant life.

Some of the general features concerning desert soils may be mentioned here:

(1) There is no differentiation of the soil profile into genetic horizons.

(2) The character of the soil is mainly determined by the composition and nature of the parent rock.

(3) Topography has a decisive influence on salinity, moisture and vegetation.

(4) The physical constitution of the soil is generally a more important determinant of plant life than its chemical constitution.

(5) Accumulation of salt in the surface-layer generally increases with the increase of the fine textured soil fractions.

(6) No humus is formed here even under permanent vegetation.

The main varieties of soil observed and studied in the areas under review are: hammadas, loess, sands, salines, grey calcareous steppe soils, alluvials.

A. Hammadas

Hammadas are climatically conditioned desert soils, generally distinguished by their gravelly or stony surface cover. Stones and pebbles may also be present in the deeper soil layers. The formation of the hammada is connected with selective surface erosion caused by desert winds which transport fine particles from the soil surface and leave the heavier ingredients in loco.

The hammadas are most typical of, and most common throughout the entire area, especially in Sinai, in southern Transjordan and in the northern part of the Syrian desert. There are a number of varieties to be distinguished in this series, two of which may be mentioned here (Evenari & Orshansky, 1948):

(1) The haline-gypseous hammada has a fine and marly subsoil containing a considerable amount of soluble salts. Generally the subsoil is separated from the parent material by a crust or concretions of gypsum occurring at various depths. This is the most typical and the most sterile soil-variety of the desert. The scant amount of precipitation (below 100 mm.) is apparently not sufficient to leach out the amount of salts contained in the parent rock or to remove the salts accumulating in the dry season through capillary action.

(2) Non-haline hammadas are abundant in the northern, i. e. somewhat more rainy, parts of the area. They resemble the former in appearance but the subsoil is often of coarse texture and generally lacking in gypsum and sodium salts. There are certain additional varieties of hammada still awaiting investigation.

B. Læss soils

These are confined to plains, valleys and depressions at or near the border line of the desert. Large stretches of this soil occur in the northern part of the Negev (Israel), in Edom and Moab (Transjordan) and smaller areas in Sinai. A loess belt of considerable width encircles the Syrian and Iraqi deserts on their NE and W edges. This type of loess strongly resembles that of North Africa and of the Aralo-Caspian region. Its origin is at least partly associated with the adjacent hammadas, from which the fine material is blown out and brought to sedimentation on the borders of the desert. Here the closer vegetation cover is able to protect the deposited soil against further transportation. Due to its

favourable moisture conditions the loess is the most fertile desert soil; yet under bad drainage it inclines to salinization.

C. Sand dunes and sand fields

They occupy considerable stretches in the southern part of the area but are less abundant than other soil types. In Northern Sinai, the broad belt of huge sand dunes is of marine origin. Elsewhere in the region, (Southern Sinai, Transjordan and Northern Arabia) sands are derived from local Nubian sandstone (mainly Lower Cretaceous) and igneous rocks. In the southern part of the Syrian desert (Shamiya Desert, W of Basra) large areas have a shallow cover of sand coming from the Nefud (Arabia). While the dunes have but poor vegetation, the troughs between them, as well as the sand plains are much richer in this respect. Sterile hammada plains when covered with onblown sand soon become populated with plants, since the sand cover decreases considerably surface evaporation while increasing the absorption of rain water. Generally, in sandy deserts plant life is much more intense and surface coverage much higher than in other desert habitats.

D. Salines

Two main types of salines are met with in this region:

(1) Automorphous salines in which salinity is primary and due to the salt content of rocks which under conditions of very poor precipitation could not have been leached out. The haline-gypseous hammadas may also belong here. This type is rather common in the southern portion of the area (Sinai, Southern Transjordan, the Araba) and represent the most desolate desert habitats in which vegetation is struggling both against drought and the salinity of soil.

(2) Hydromorphous salines cover considerable areas of the region, e. g. the Dead Sea region, the Araba, the foreshores of the gulfs of Suez and of Aqaba, the large depression of Wadis Sirhan and Jaafar (SE Transjordan), the Euphrates and Tigris Valleys, considerable patches of the Jezira, etc. These soils may be subdivided into high water-table salines, and salines subjected to seasonal inundation by salt or fresh water bodies. A good deal of these salines are also caused by faulty irrigation methods (especially the Tigris and Euphrates soils). Almost all of them are of the white alkali type. The highest amount of total soluble salts still allowing plant life to exist has been found to be about 16% (as referred to dry matter). The hydromorphous salines harbour a rather dense vegetation, rich in species of higher life forms.

E. Grey calcareous soils

There are in this region also huge areas of grey non-saline soil derived from various calcareous rocks; this is especially common in the Syrian desert, northern Iraq and Transjordan. It is a typical steppe soil, highly calcareous, and its fertility is conditioned by the amount of precipitation and the topography. In areas of strong relief this soil is very shallow and skeletal, in flat areas it is fairly deep and free of stones. It is this soil which carries the most typical, edaphically unspecialized, vegetation of the desert and steppe in the milder parts of the area. The amount of $CaCO_3$ so far examined ranges between 20-70%.

F. Alluvial soils

This soil variety together with that of loess is very often under cultivation. It is limited to the banks and outlets of rivers and wadis. Along the Jordan, Euphrates, Tigris and elsewhere in the Mesopotamian Plains these soils are made up of heavy loams tending to salinization. Along the rivers a well developed riparian vegetation, including forests of Populus and Salix, form broad, green belts, contrasting with the poor, grey vegetation of the adjacent deserts. In the surroundings of the Dead Sea and the Lower Jordan Valley, there is a series of isolated oases located at the outlet regions of the rivers, with a Sudano-Deccanian arboreal vegetation.

The above types constitute the bulk of the soils of the region. Each of them can be readily subdivided into a series of minor units. They have been recorded here for their ecological importance. Some of them have been thoroughly examined while others still await further investigation.

PHYTOGEOGRAPHY

While in its vegetational physiognomy the area under review is more or less uniform, it is extremely heterogeneous in the geographical make-up of its flora. The phytogeographical complexity of this region has already been pointed out by Grisebach (1884), Boissier (1867-88), Tristram (1884), Hart (1891), Post (1896) and others. But it was not before Eig (1931-32) that a complete geographical analysis of the flora of Palestine (including that of Transjordan) was made for the first time. In this analysis it has, among others, been revealed that the flora of the desert parts of Palestine comprises a high proportion of species belonging to the Irano-Turanian element and another to the Saharo-Sindian element. Similar analyses have been made by the author for the Sinai (Zohary,

1935), for the Syrian Desert (Zohary, 1940), and for Iraq (Zohary, 1950). The aim of these analyses was not only to obtain approximate figures on the phytogeographical groups constituting the flora but also to delimit the various phytogeographical territories of the countries examined. In the table below the figures of the main phytogeographical groups are given for four countries.

	Mediterranean	Saharo-Sindian	Irano-Turanian	Eurosibero—Boreoamerican	Sudano-Deccanian	Mediterrano—Irano-Turanian	Mediterrano—Saharo-Sindian	Irano-Turano—Saharo-Sindian	Mediterrano—Irano-Turano—Saharo-Sindian	Subtropico—Boreal	Subtropico—Tropical	Diverse	Endemics
Palestine	863	299	309	15	41	367	9	35	4	112	69	126	150
Syrian desert	520	239	588	10	24	374	6	35	11	105	33	95	171
Sinai	118	297	103	-	41	175	11	32	7	23	65	60	36
Iraq	197	118	968	23	2	356	4	28	7	101	44	71	190

The above figures are certainly not final; however, the proportion allotted to each group will probably be changed only insignificantly by future investigation.

The high number of the Mediterranean species in the above figures is not typical of the desert. They are due to the fact that the analysis also includes the Mediterranean regions of these countries, as well as a certain number of species growing in secondary habitats which are not typical of the desert. With the exclusion of the flora of the Mediterranean territories the number of Mediterranean species remains a minority, as seen from the figures of Sinai and Iraq where there are only minor Mediterranean enclaves. Although the number of phytogeographical groups composing the flora of the area is rather high, there are only two phytogeographical elements which are important within the reviewed area, namely the Irano-Turanian and the Saharo-Sindian, each forming a plant-geographical territory for itself. The other groups are dispersed here and there and not only do not form territories of their own but are also vegetationally less important. The Saharo-Sindian territory of the area is a part of the middle Saharo-Sindian subregion (Eig, 1931-32), comprising the eastward continuation of the Sahara from Cyrenaica to Southern Iraq. The Irano-Turanian territory comprises almost the entire Mesopotamian subregion (Eig, 1931-32), i. e. the

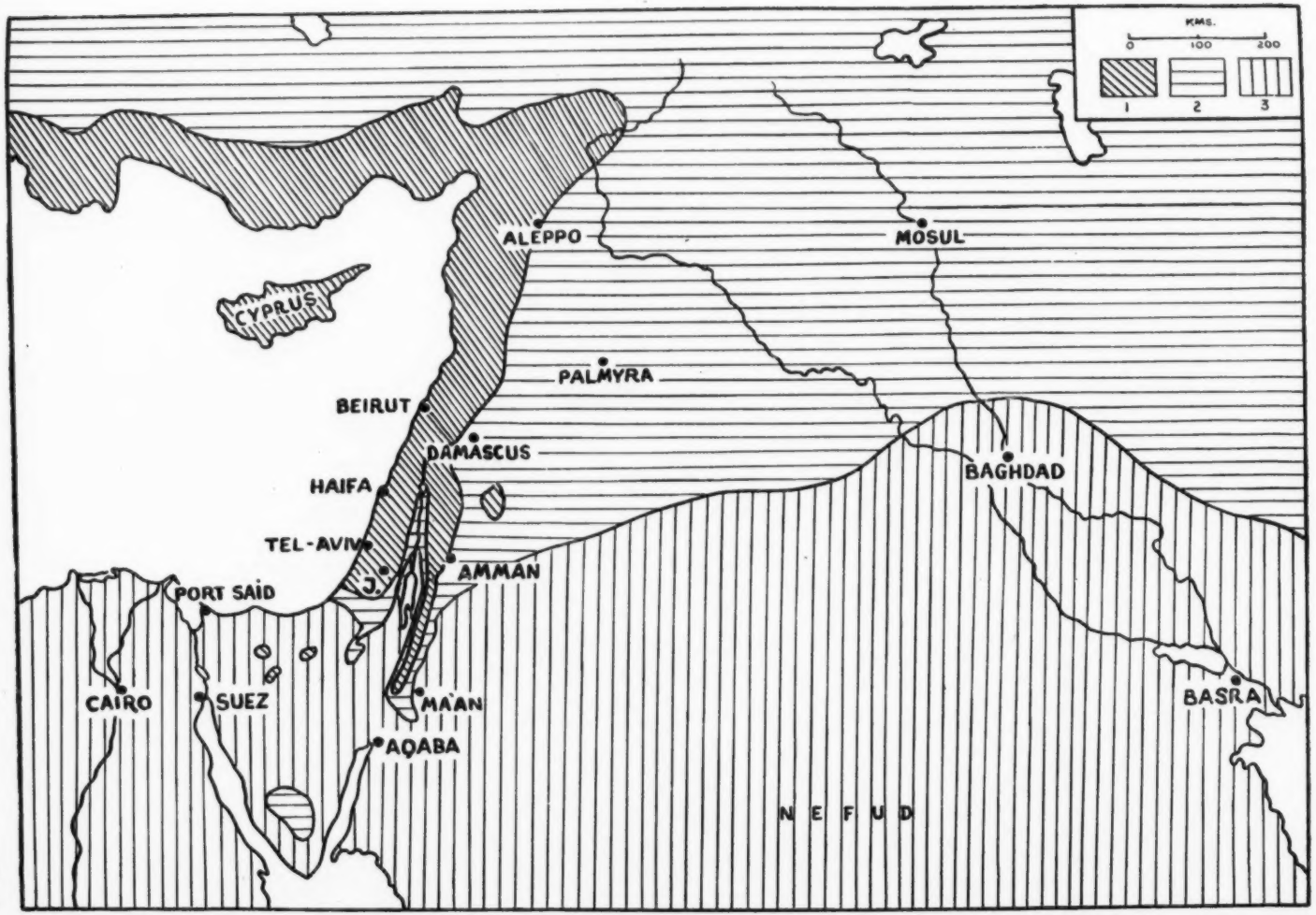

Fig. 2.

The phytogeographical territories of the Near Eastern Deserts. 1: Mediterranean Territory; 2: Irano-Turanian Territory; 3: Saharo-Sindian Territory. J=Jerusalem.

western part of the Irano-Turanian region. In the accompanying sketch map (Fig. 2) the lines separating these territories are roughly drawn according to our own and recorded data.

These two territories are well distinguished from one another climatically, edaphically, floristically, vegetationally and agriculturally. The Irano-Turanian territory displays a more continental climate and is more rainy than the Saharo-Sindian territory (with an annual rainfall up to 350 mm.). The main soil varieties belong to the grey calcareous steppe soil which is generally not saline. Besides, the greatest part of the loess area is confined to this territory; where salt-lands occur they are mostly hydromorphous and the hammadas here belong primarily to the non-haline variety. The flora of this territory is rather rich in species. Mention may be made here only of a few genera well represented in the Irano-Turanian territory and altogether lacking in the Saharo-Sindian part.

These are: Acantholimon, Cousinia, Acanthophyllum, Achillea, Eremurus, Eremostachys, Leontice, Gundelia, Cachrys, Ferula and many others.

Vegetationally, this territory possesses a series of major plant communities exclusive of the Saharo-Sindian territory, as will be seen in the next section. Besides, coverage of vegetation is considerably higher. Agriculture in this territory is unstable and subjected to extreme changes in annual rainfall. There are here, however, huge stretches of land, annually ploughed though not always harvested.

In contrast to this, the Saharo-Sindian territory of the area seldom obtains an amount of precipitation exceeding 200 mm. It possesses typical desert soils (haline hammadas, automorphous and hydromorphous salines and sand dunes). It is floristically rather poor though displaying a series of genera not represented in the Irano-Turanian territory. These are: Zilla, Retama, Anastatica, Citrullus, Reboudia, Gymnarrhena, Lasiopogon and many others. Vegetationally it is distinguished from the Irano-Turanian territory by a series of plant communities of a higher rank (see below, p. 211). Vegetation coverage rarely exceeds 50%; a density of 5-20% is rather characteristic. Agriculture is altogether lacking in this territory except by irrigation or in places flooded annually.

The distinction between, and the demarcation of, the above two territories in the steppes and desert area of the Near East are of paramount importance both to the phytogeography and the problems of land use in this vast area.

VEGETATION

Despite the extreme conditions prevailing in the area vegetation is differentiated into a great number of rather well delimited plant-sociological units, which can be grouped into the following classes:

1. *Artemisietea Herbae albae*
2. *Anabasidetea articulatae*
3. *Retametea Roetami*
4. *Haloxylotea salicornici*
5. *Acacietea Raddianae asiaticae*
6. *Suaedetea palaestinae*
7. *Rudereto-Secalinetea*
8. *Populetea euphraticae*
9. *Potametea*
10. *Phragmitetea*

A few remarks on habitat, characteristic species and distribution of these classes must be sufficient here.

(1) Class Artemisietea Herbae albae (Pl. 13A).

Habitat: Confined to and most characteristic of the Irano-Turanian territory. Limited within areas having an annual precipitation of 300-150 mm.; rarely penetrating into areas with less rainfall but compensated by favourable soil moisture. Soils: mostly non-saline grey calcareous steppe soil, loess, stony hillsides, etc.

Distribution: Mauretania, High Plateau of North Africa, Egypt, Sinai, Palestine, Syrian desert, Iraq and eastwards.

Characteristic species: Artemisia Herba alba, Noëa mucronata, Anabasis Haussknechtii, Haloxylon articulatum, Thymus syriacus, Phlomis orientalis, Ph. Bruguieri, Ph. brachyodon, Cousinia stenocephala, Centaurea Behen, Retama Duriaei, Zizyphus Lotus, Pistacia atlantica var. latifolia, Poa sinaica, P. Eigii, and many others.

(2) Class Anabasidetea articulatae (Pl. 14).

Habitat: This class comprises most af the vegetation units confined to dry, gravelly hammadas or gypseous flats, rocky deserts and automorphous salines, mostly confined to the Saharo-Sindian territory of the area. The annual amount of rainfall nowhere exceeds here 200 mm.

Distribution: Sahara, Western and Eastern Desert of Egypt, Sinai, Negev, the Araba, Judaean Desert, S-Transjordan, N-Arabia, Syrian Desert.

Characteristic species: Anabasis articulata, Zygophyllum dumosum, Reaumuria hirtella, R. palaestina, Halogeton alopecuroides, Atriplex palaestina, Atractylis serratuloides, Salsola vermiculata var. villosa, Chenolea arabica, Gymnocarpos fruticosum, Herni-

aria hemistemon, Erodium glaucophyllum, Helianthemum cahiricum, Suaeda asphaltica, Fagonia grandiflora, and many others.

(3) Class Retametea Roetami (Pl. 13B).

Habitat: This class inhabits the sand dunes and sand fields along the SE Mediterranean littoral from Syria to Cyrenaica. The dune belt of this sand region is especially well developed in the Israel-Egyptian sector. While in the northern part of this belt one still encounters Mediterranean psammophilous associations, its southern part is purely desertic.

Distribution: Egypt, Sinai, Palestine.

Characteristic species (of order Retametalia arenaria, suborder Retametalia arenaria sinaica): Artemisia monosperma, Retama Roetam, Aristida lanata, A. scoparia, Pennisetum dichotomum, Panicum turgidum, Pancratium Sickenbergeri, Convolvulus lanatus, Iris Mariae, Astragalus fruticosus, A. cahiricus, Cyperus conglomeratus, Tamarix articulata.

(4) Class Haloxyletea salicornici (Pl. 15A).

Habitat: This class is well delimited both in its ecology and its floristic composition, although its phytosociological units are as yet not adequately known. It is a non-typical Saharo-Sindian class of vegetation, showing clear relations to the Irano-Aralo-Caspian 'Saxaul' vegetation. It occupies interior dunes and sand fields, sandy hammadas, wadi banks and wadi beds, almost exclusively in the southern part of the area. Soil dry, and rarely saline. Rainfall not over 100 mm.

Distribution: S-Iraq, N-Arabia, S-Transjordan, the Araba, W-and S-Sinai, Eastern Desert of Egypt.

Characteric species: Haloxylon salicornicum, Haloxylon persicum, Calligonum comosum, C. Eigii, Ephedra alata, Artemisia judaica, Heliotropium persicum, Plantago ciliata, Scrophularia hypericifolia, Rhanterium epapposum, Teucrium Olivieri and many others.

(5) Class Acacietea Raddianae asiaticae (Pl. 15C).

Habitat: This class consists of Sudano-Deccanian savannah-like vegetation fragments scattered in the southern part of the area. Acacia is most characteristic of this vegetation. As a Sudano-Deccanian element it generally requires high winter temperatures and permanent moisture during summer, and accordingly it is mainly confined to outlet regions of fresh water bodies within the Saharo-Sindian territory; it never occurs in salines.

Distribution: Sinai Peninsula, Araba, Wadis Sirhan, Jauf and Saqaqa (N-Arabia), Dead Sea region.

Characteristic species: Acacia Raddiana, A. spirocarpa, A. Seyal, Moringa aptera, Balanites aegyptiaca, Salvadora persica, Cordia Gharaf, Zizyphus Spina Christi, Ochradenus baccatus, Boerhavia spp., Abutilon spp., Cassia obovata, C. acutifolia, Solanum sanctum, Calotropis procera, etc.

(6) Class Suaedetea palaestinae (Pl. 13 C, D).

Habitat: This class of vegetation is characteristic of the hydromorphous salines of the area and is best developed in the Saharo-Sindian territory. The salines of the East Mediterranean littoral, although vegetationally different from those of the interior, should also be included within the latter for ecological and floristic reasons. The salines are preponderantly of the white alkaline type (solonchak) and mostly composed of chlorides. They are caused mainly by overflooding, high level of underground water, faulty irrigation, etc.

Distribution: Egypt, Sinai, Transjordan, the Araba, Dead Sea region, Lower Mesopotamia.

Characteristic species: Tamarix tetragyna, T. maris mortui, T. macrocarpa, T. mannifera, Suaeda palaestina, S. fruticosa, S. monoica, Salsola Rosmarinus, Schanginia baccata, Statice pruinosa spicata, Nitraria retusa, Atriplex Halimus, Chlamydophora tridentata, Tetradiclis salsa, Anabasis setifera, and others. Prosopis farcata, Alhagi Maurorum and Eragrostis bipinnata, though occurring as leading plants of the next class also occupy large areas of the hydromorphous salines.

(7) Class Rudereto-Secalinetea (Braun-Blanquet, 1936).

Habitat: Cultivated and weedy habitats. Occurs under both Irano-Turanian and Saharo-Sindian conditions in dry and irrigated fields.

Distribution: Everywhere throughout the area.

Characteristic species: Prosopis farcata, Alhagi Maurorum, Achillea Santolina, Eragrostis bipinnata, Avena spp., Leontice Leontopetalum, Cynara syriaca, Phlomis pungens, Scolymus maculatus, Convolvulus arvensis, Sinapis arvensis, Vaccaria segetalis, Galium tricorne, Cephalaria syriaca, Salvia syriaca, Malva spp., Chenopodium spp., Hordeum murinum, Sisymbrium erysimoides, etc.

(8) Class Populetea euphraticae.

Habitat: This class comprises the arboreal vegetation units growing on the banks of the major rivers such as the Tigris and Euphrates, the Jordan River, the

Habur and their tributaries. This vegetation constitutes a gallery-forest sometimes rather dense and sharply contrasting with the dry desert landscape. The vegetation is often subjected to seasonal flooding whereby the amount of salts in the soil may increase in summer.

Distribution: Israel, Transjordan, Syria, Iraq.

Characteristic species: Populus euphratica, Salix acmophylla, Tamarix jordanis, Prosopis farcata, Glycyrrhiza glabra, Vitex pseudo-negundo, etc.

(9) Class Potametea (Br. Bl. 1943).

Habitat: Lakes, ponds and streaming fresh or brackish water bodies.

Distribution: Scattered here and there throughout the region.

Characteristic species: Salvinia natans, Ranunculus circinatus, R. aquatilis, Lemma spp., Limnanthemum spp., Nuphar luteum, Potamogeton spp., Ceratophyllum demersum, etc.

(10) Class Phragmitetea (Koch, 1926).

Habitat: Banks of rivers, swamps and inundated places. Mostly confined to fresh-water soils but sometimes also to saline springs and rivulets.

Distribution: Everywhere throughout the region.

Characteristic species: Phragmites communis, Saccharum aegyptiacum, Cyperus Papyrus, Polygonum acuminatum, Scirpus lacustris, Sparganium neglectum, Panicum repens, Inula viscosa, Juncus acutus, J. maritimus, Typha angustata, and many others.

SUMMARY

1. On the basis of the author's observation and of data published by other scholars the geobotanical nature of the Near Eastern deserts is described.

2. The climatic relations and the main soil types of the region are described in brief.

3. The phytogeographical subdivision of the area into its Irano-Turanian and Saharo-Sindian territory is given here for the first time on the basis of floristic and vegetational analyses.

4. On the basis of comprehensive plant-sociological studies and published data an attempt is made to establish for the deserts of the Near East ten classes of vegetation well delimited by floristic and ecological characteristics. These cover almost all of the plant communities met with in the area.

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Two More Yarmukian Figurines

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NEW INVESTIGATIONS carried out on the Neolithic site at Sha'ar ha-Golan have borne fruit in new discoveries. Among these new discoveries are two figurines of particular interest which broaden our knowledge of the plastic art of the Yarmukian culture.

(a) One figurine was unearthed by Mr. Yehuda Roth in the grey soil of the Neolithic layer which forms part of the steep bank of the Yarmuk River. Besides the figurine a pick was found chopped out of a flint pebble and a very fine long flint blade; there were also some very brittle fragments of potsherds, decorated with a herring-bone pattern (Pl. 16).

The figurine is of soft limestone (height 91 mm., width 42 mm.) and is of oval shape. The limestone had been polished on all sides, and in some places the polishing is still clearly discernible. Patches of vermilion testify to the figurine's having been originally covered with a coat of paint. The vermilion had been mixed with oil which was absorbed by the stone, forming a yellowish-gray layer which covers the whole figurine. This layer prevented the stone from crumbling and thus preserved the shape of the figurine.

The figurine represents a schematic carving of a bending woman. From the front the head appears large and rounded at the top. Two diagonal incisions represent the eyes. A deep semicircular incision, separating the head from the body, indicates the neck. On the neck there are fine decorative lines apparently representing either a necklace or tattooing. Two triangles descending from the neck delineate the breasts. The thighs are formed by deep incisions which can also be seen from the back of the figurine. From the back we see the coiffure, represented by a trapezoid shape. Within the trapezoid parallel linear incisions indicate the hairs.

Below the coiffure a deep incision marks the shoulders. This line extends down on both sides of the figurine until it joins the horizontal incision which stands for the waist. These two lines form acute angles, which indicate the hands. A vertical incised line represents the backbone.

(b) The second figurine was discovered by Mr. M. Golani in a ploughed field near fish-pond 'B'. It is made of soft limestone, height 66 mm., width 38 mm., and has an ellipsoid form. Unlike the first figurine, there is no trace of paint (Pl. 16).

Two deep, round depressions indicate the eyes. Above them there is an incision which encircles the head, presumably marking the coiffure. On both sides of the head there are parallel incisions representing tattoo-marks. Also visible on both sides of the figurine are traces of the almost obliterated lines that once adorned it.

It is the opinion of most scholars that Neolithic figurines served as idols and that they were made specifically for the purposes of primitive magic.

Neolithic schematic figurines are well known from the Mediterranean, where the plastic art was apparently well developed, but in this area we do not find anything comparable in style to the Yarmukian.

Apparently an individual style developed at each place, in accordance with local conditions which left their imprint on the artist's emotion and his way of expression.

The Yarmukian artist knew how to utilize skilfully his material and the space at his disposal. He could depict the image of a human with a few clear-cut lines. This simplicity of style is one of the hall-marks of Yarmukian art.

The Excavations at Beth Yerah (Khirbet el-Kerak) 1944-1946*

B. MAISLER, M. STEKELIS and M. AVI-YONAH

Hebrew University, Jerusalem Israel Dept. of Antiquities

3. THE NORTHERN AREA

BY M. STEKELIS AND M. AVI-YONAH

THE southern area was excavated partly in the first and partly in the second campaign, while all the work done in the northern area belongs to the latter.

In this area a trench was dug, 50 m. long from east to west and 10 m. wide from north to south. This original trench had to be widened until the area excavated finally extended over 2475 sq. metres.

In the beginning of the excavation there appeared an Arab wall of basalt blocks, 1.20 m. wide and 35 m. long, as far as could be ascertained. This wall, as well as other similar constructions, were removed after recording.

Three extensive constructions were found below these late buildings: (A) a Late Roman thermal establishment, (B) a wall with towers built of ashlar masonry, and (C) a great building of the Early Bronze Age.

A. *The Late Roman Therms*

The bath was composed of two parts: the frigidarium and a hypocaust cellar (see plan fig. 1).

The *frigidarium hall* was almost square (11 by 10.5 m.). It had its principal entrance from the west. The main door was 1.50 m. wide. A secondary entrance was found near the south-western corner of the south wall which was 1.10 m. wide. In the east wall a marble threshold was found *in situ*. Apparently there was a third entrance on this side, 1.75 m. wide. The plan of the building obliges us to assume a fourth entrance from the room over the hypocaust.

The frigidarium was once paved with marble slabs, fragments of which are still visible. Where the pavement was missing traces of the slabs have been preserved (Pl. 17 B).

* Concluded from *Israel Exploration Journal*, Vol. 2, No. 3, 1952, pp. 165-173.

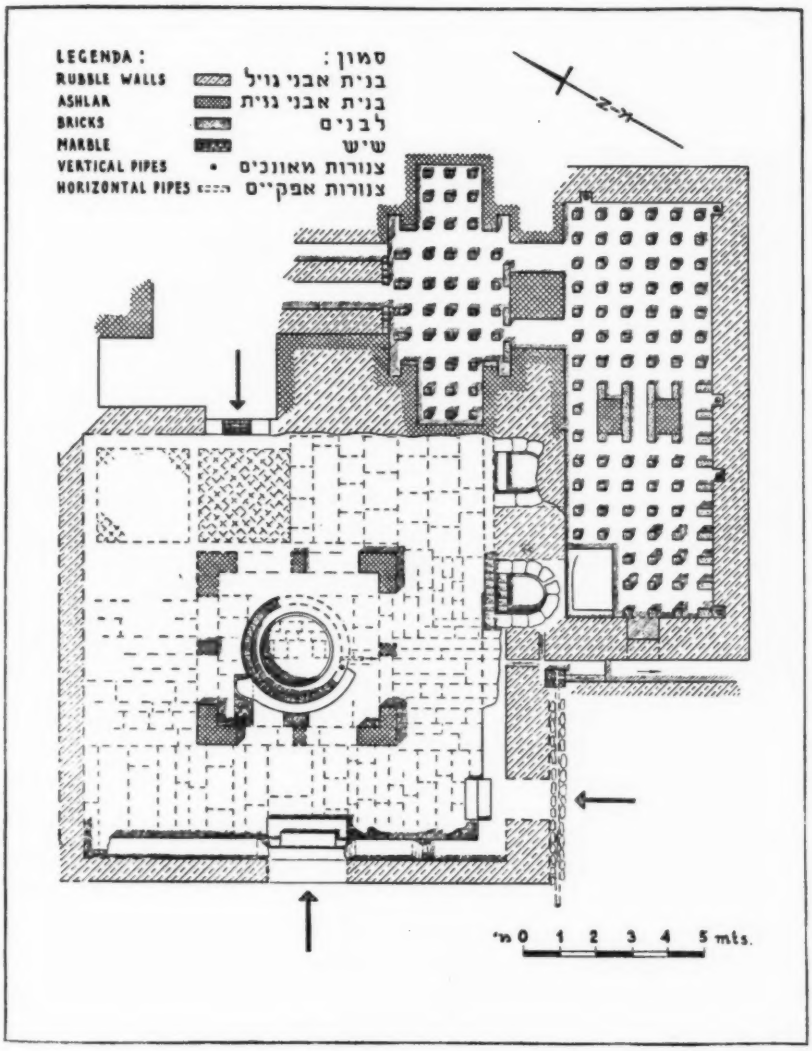

Fig. 1: The Roman therms

A round pool occupied the centre of the hall: its diameter was 2 m., and its depth 0.75 m. It was built of rubble, but its interior and floor were lined with marble. An opening of a water-pipe leading to the pool was found in the wall on the south side. A round bench encircled the pool; it was made of burnt

bricks, and was lined with marble. Small fragments of this marble lining were adhering to the brick wall. Here and there on the western side, i. e. opposite the main entrance of the hall, were found the foundations of a semi-circular rubble partition wall curving along the bench for about a third of its circumference. This partition might have served to protect the bathers both from the winds blowing through the west door, and also from being seen from the outside.

Grouped around the pool were the foundations of four double, L-shaped pillars, forming a square of 5.50 m. The pillars were of ashlar, lined with marble. Half-way between the pillar foundations smaller impressions appeared, apparently forming the foundations of narrow columns or pillars which bisected the spaces between the corner pillars. The whole seems therefore to have formed a kind of domed pavillion above the pool. Coloured and gilt mosaic cubes, stuck to plaster, were found among the debris on the floor of the hall, proving that the walls or the dome were decorated with mosaics.

Rubble benches ran along the western and part of the southern wall of the hall. In the centre of the bench between the main door of the hall and its south-western corner, was a kind of semicircular headrest. It is possible that the other benches had similar rests. The benches had been plastered with several layers of plaster reinforced with ribbed potsherds.[10]

The width of the western and northern walls of the hall was ca. 0.65 m. The southern section of the east wall and the whole southern wall were twice as thick as this (up to 1.30 m.), for on these sides the hall bordered on the caldarium and tepidarium and the stronger wall was required to strengthen the resistance to the outward stress of the arches in the hypocaust cellars, to prevent a cooling-off of the air in the two heated rooms, and to obtain sufficient space for the bath-tubs sunk in the thickness of the wall.

The second part of the bath preserved was the *hypocaust cellars.* These were built in the shape of an L. The depth of the cellars was 2.80 m. The foundations of big stone pillars divided the short arm from the long arm and the long arm itself. In one place the passages between these pillars were narrowed down by an addition of bricks. It seems that these foundations, together with the ashlar pillars built into the walls of the cellar, served as bases of arches which were to lend additional strength to the floors of the upper rooms. These floors rested

[10] Cf. the gateway to the Ummayyad palace at Kh. Mafjar, D. C. Baramki, *Quart. Dept. Antiq. Palest.*, 6, 1938, Pl. XLIII, 2.

partly on the arches, but to a larger extent on pillars of burnt bricks *(suspensurae)*. Rows of such pillars filled the whole space of the cellar and were built of standard bricks (21 cm. a side, 3 cm. thick). A layer of mortar 3 cm. thick joined one brick to another. The faces of the pillars were plastered. The interval from one pillar to another was 40-42 cm., i.e. double the measure of the bricks. In the south-western corner of the cellar one pillar stood *in situ*, topped with parts of the floor of the upper room. An arch constructed of bricks and half-bricks sprung from the vertical pillar, 90 cm. in height. Each layer of bricks projected a little beyond the rim of the layer below, until the resulting diagonal touched the opposite one starting from the other pillar. Above this arch there were three layers of double-sized bricks *(bipedales)* which supported the marble floor of the room above the cellar.

The floor of the cellar was made of hard cement. The cellar itself was surrounded by a thick wall (1.30 m.). In the long arm, this wall was built of a mixture of big and small rubble stones, joined with mortar mixed with many sherds. In the short arm, the walls were lined with ashlar and filled with rubble. The square niches in these walls are of special interest. Inside the niches three pottery pipes were found *in situ*, joined together by flange-joints. Some square pipes with many openings *(tubuli)* were also found, especially along the walls. All these pipes served to bring the hot air from the cellar to the *sudaria* above.

There was no similar arrangement of pipes along the south wall. There the brick pillars touched the walls directly. We may conclude therefore that the room above the short arm of the hypocaust cellar, which was immediately above the opening of the furnace, and which had a special arrangement for the piping of hot air from below, was the warm room of the bath *(caldarium)*; while the western part of the long arm, which was the furthest removed from the furnace and which lacked the piping from the hypocaust, served as a *tepidarium*.

In the north-western corner of the long arm there was a solid base of bricks in the cellar (1.80×1.25×0.85 m.). This base touched one of the two apsidal bath tubs made in the north wall of the *tepidarium*.

In the western end of the bath there was an opening, above which the remains of an arch could be seen. This opening was later-on blocked with small rubble and mortar.

The second opening of the cellar was placed at the northern end of the short arm. At this spot there were two narrow passages built of rubble. The eastern passage (0.50 m. wide) was on a higher level than the western one, and

apparently served as a means of entering the cellar. The other opening was 0.75 m. wide and on a lower level. Its walls were found blackened with soot and on its floor was a stratum of ash and soot 0.10 m. thick. This was therefore the furnace which heated the bath.

Outside the furnace was a small room *(praefurnium)* and west of it another small room (5 m. by 1.90 m.), which served probably as store-room for heating materials. This latter room was built of thick rubble walls.

Water for the bath was supplied by a pipe which came from the south-west and which diagonally crossed the earlier EB building (Pl. 17A). It is quite probable that this pipe-line continued to the great Tiberias aqueduct, which begins in the Wadi Fejjas. Remains of this aqueduct were seen at a high level above the Kibbuz Kinnereth. The bath conduit proper was built of pottery pipes, joined together flange-like and set in thick cover of stones and cement. The pipe ended near the southern wall of the hall. At its end there was *in situ* a stone pierced with three holes forming a T. The three arms of the T allowed the water to be directed respectively towards the pool in the hall, the bath-tubs and the outflow channel of the bath. This channel was connected with the pool and issued under an arch below the southern wall of the hall; it then turned towards the south-western corner of the bath and continued eastwards to the Lake of Galilee along the southern wall of the hypocaust cellar. Its maximum depth was 1.74 m., its width 0.60 m. Its walls were covered with hydraulic cement.

B. *The Fort*

The remains of a fort built of ashlar on rubble foundations were visible to the north of the bath.[11]

The small finds and the dating.—The small finds in the bath and fort areas included two Umayyad coins on the floor of the hall and four fragments of a bilingual inscription, most of which was in Greek and the last line in an unidentified script (Georgian?) (fig. 2). The Greek letters indicate a date in the sixth century. The fragments of the inscriptions were found on the floor of the hypocaust cellar. The pottery found included Rhodian jar-handles, ribbed cooking pots and ring-base bowls.

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[11] This fort and a basilical building (a synagogue?) inside it were completely excavated in 1950 by Mr. P. L. O. Guy on behalf of the Israel Department of Antiquities. The 1945-46 finds need not therefore be detailed here.

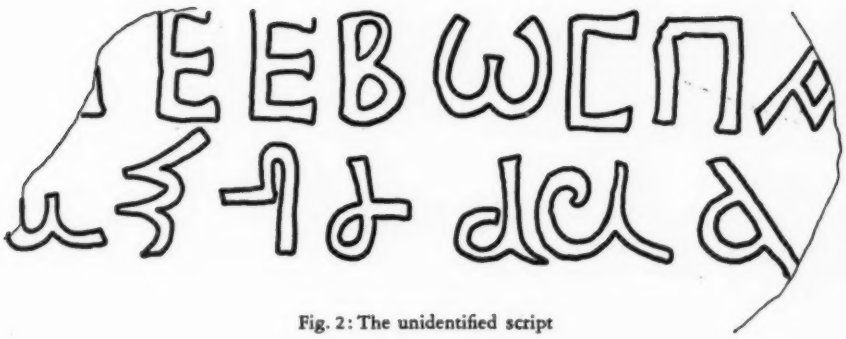

Fig. 2: The unidentified script

The various phases of settlement in this area in the later periods can be provisionally defined as follows: (i) A temporary Hellenistic settlement (the Rhodian jars); (ii) The fort (2nd-3rd cent. A.D.); (iii) The original bath (4th or 5th century A.D.), which rested on the wall of the fort and could not have been erected as long as the fort was used for its original military purpose; (iv) Repairs of the bath: change in the style of the paving of the hall, filling-in of the store-room and covering of the space thus gained by another pavement. (The 6th cent. inscription might be connected with these later changes); (v) The destruction of the cellar roof and the fall of the inscription with other debris into the cellar (7th cent.-in consequence of the Persian or Arab invasion?); (vi) Renewal of settlement in the Arab Period above the ruins of the bath (see above, p. 218).

C. *The Early Bronze Age III Building*

This building extended over an area of ca. 1200 square metres. Its plan was nearly rectangular, with almost perfect right angles (88^0). It was constructed of big basalt blocks. Its length from east to west was 40 m., its breadth from north to south 30 m., the width of the walls was ca. 10 m.; their height 0.80 to 2.00 m. from the foundation, i.e. 4 to 9 layers (see plan, fig. 3, and Pls. 17A, 18A).

Eight big stone circles were sunk into the surface of the stone wall. There were four stone partitions, each 2 m. long, in every one of them. These were laid from the circumference of each circle pointing towards the centre, and divided its interior into four sections. The partitions ended before reaching the centre of the circles and are oriented in each circle exactly in the four principal directions. The interior surface of the circles between the partitions was paved with stone one layer thick. The breadth of the remaining part of

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Fig. 3: The Early Bronze Building: I—VIII the Circles; 2—the Hall; 3—Square Room (sounding in depth) 6-

depth) 6—the Court; 7—the Gateway; 9—Courtyard of a House.

the wall between the circumference of the circle and the edge of the wall varied from place to place between 0.60 m. and 1.50 m.

The building had paved streets running north, west and south of it. The width of the streets was 2.50 m. In many places their paving has been destroyed because of later building operations. At the western end of the northern street was found a staircase of five stairs, which were attached to the northern wall of the building. They rise from east to west up to the crossing of the two streets. The width of the stairs was 3.50 m. (see Pl. 18 B). Among the paving stones of the streets there were a certain number with shallow cupmarks. At a distance of 2.50 m. to the west and south of the building (i. e. beyond the streets) there were various walls parallel to those of the main building. The north-eastern part of the big building was destroyed in the course of the construction of the later baths (see above, p. 218).

Circle I: Diameter 8 m. Its south-western part was destroyed during the construction of the Roman fort. Three of the projections are well preserved, the fourth is completely destroyed.

Circle II: Diameter 8 m. Its northern part was destroyed during the construction of the later fort. Two of the partitions have been preserved in their entirety, the third only for a length of 60 cm., while the fourth has disappeared entirely.

Circle III. Diameter 9 m. Three of the partitions are well preserved while the fourth one and part of the flooring of the circle were destroyed when the water conduit of the later bath was laid across the circle.

Circle IV. Diameter 7 m. Three of the partitions are preserved while the fourth one was completely destroyed.

Circle V. Diameter 8 m. Three of the partitions were well preserved, as was half of the fourth. The paving in the centre of the circle was completely destroyed by later constructions.

Circle VI. Diameter 8 m. Two of the partitions were well preserved, whereas the two others and part of the paving were destroyed by later constructions.

Circle VII. Its diameter could not be established, because most of its circumference has disappeared below the walls of the later bath. Parts of two of the partitions can be clearly seen. In one of the sections there was an oven made of mud, covered with a considerable quantity of soot.

Circle VIII. Only a few traces could be seen of this circle, because it was almost entirely covered by the later baths.

Altogether, eight circles were uncovered entirely or in part. From the plan

of the building it may be inferred that there existed a ninth one, covered up entirely by the later bath.

This Early Bronze Age building was entered through a gate at its south-eastern end. Its width was 7 m. The gate gave access to a court 25 m. in length. Near the threshold was found an oven of half-burnt mud which rested on the south wall. Opposite it another oven was found, constructed in the same manner, but in two parts; the inner one was oval while the shape of the outer one cannot be now established. The measurements of the inner part were 0.75 and 0.60 m. and opened toward the north. In the middle of the opening, which had a width of 0.50 m., stood a column which was joined by arches to the two side walls; the latter turning inwards and upwards. In the middle of the oven was debris, apparently belonging to its roof. Within this debris was found a pottery fragment with four holes, apparently the key-piece of the vaulted roof. As stated above, other fragments of half-burnt mud were found outside the inner oven; we have thus one oven within another. In the centre of the inner oven was a ribbed pottery stand and near it a bowl. Both were of characteristic burnished Kh. Kerak Ware. A third oven was in the north-western corner of the court.

In the west wall of the court was an opening which led to an enclosed space, viz. a hall paved with pebbles (Pl. 19A). In this space two stone bases were found, which were meant to support either columns of wood or statues. In the north-western corner of this 'hall' was a corridor, 2.50 m. long and 0.80 m. wide, which led into circle I. In the western wall a similar corridor was found leading into circle II. There was a stone threshold in the southern wall, to which one could mount by stairs and reach the top, between circles IV and V.

In the course of excavating this building we found a multitude of pots and potsherds of the third phase of EBA, and among them many of the type known as Kh. Kerak Ware. Figurines and a rounded potsherd, to which were attached two heads of cows, were also found (Pl. 19B). Many broken and blackened bones of animals were found in several loci, especially in the open court near the ovens, together with carbonized olive kernels, soot and other traces of fire. From the evidence of the pottery found the building must be assigned to the Early Bronze Age III.

This ancient edifice is of very great interest. As far as we have been able to determine, no similar construction has come to light in the excavations in Palestine, in the Near East, or even in other parts of the Ancient World.

The purpose of this edifice is difficult to establish. It is, of course obvious, that we have to deal here with a public building of some importance. The ancient inhabitants of Beth Yerah seem to have invested an enormous amount of labour in its construction. It may be assumed that it served as the centre of one of the principal activities of their city.

From the various possibilities the following merit consideration: the building might have been (a) a fortress, (b) a public granary, (c) a palace, or (d) a sanctuary.

(a) The first hypothesis seems excluded by the thinness and weakness of the walls surrounding the circles. Besides, the site of the building does not seem suitable for this purpose.

(b) The second suggestion, viz. that of a public granary, cannot be accepted for this reason: On the floor of circle VII were found the remains of an oven made of burnt mud clay; similar ovens were perhaps installed in the other circles, but have been destroyed since. In addition there were more ovens (already described) in the open court. The presence of these ovens in the building precludes the possibility of its being used as a public granary.[12]

(c) The third possibility, that of a palace, is not borne out by the plan of the building.

(d) There remains therefore only the last assumption, viz. that we have here a sanctuary.

The existence of an open court with four ovens, one of which contained a pottery stand joined to the floor of the oven, and a pottery bowl in its vicintity, support the suggestion that the purpose of the building was a religious one. The oven might have served as an incense stand. The fact that the partitions in all the circles point exactly in the four main directions of the compass also suggests that they were so constructed with a definite ritual purpose. On all these grounds one may conclude that this construction was the sanctuary of Canaanite Beth Yerah.

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[12] Since the above was written, a model of a Helladic granary from Melos was published (S. Marinatos, *Bull. Corresp. Hellen.*, 70, 1946, p. 342, fig. 4), which bears a striking resemblance to our building (circular bins surrounding an open court, entrance from the same direction, etc.). This find increases the probability that the building was a granary after all and the ovens a latter addition, once it went out of use. If this hypothesis is accepted, it bears striking evidence of the agricultural development and social structure of the Early Bronze settlements in the Jordan Valley. It presumes a plentiful grain crop stored in a public building connected with either a religious or secular authority.

(M. A.-Y.)

The soundings in depth in the northern sector.—In squares 10-20 we began a sounding in depth. A round oven made of half-baked clay was found in the first levels. It had two holes, each 0.05 m. in diameter, one being situated on the south side and the other on the east. These holes apparently served as draught-vents. Surrounding the oven was a construction of unhewn stones. Near it were many potsherds, all of the Hellenistic Period.

After the removal of the oven and of the constructions surrounding it, the remains of a square room (3 on plan) and an enclosed court were found at a greater depth (9). The room was paved with pebbles, on which was found a considerable quantity of potsherds. The court was paved with beaten earth. In the north wall of the room was a threshold which led to the court, in which two burnt levels were observed. From the pottery found in the room and the courtyard, they should be assigned to EBA III (= Beth Yerah IV).

Below this building there was another stratum, 2 m. thick, in which traces of brick constructions could be clearly observed. Many potsherds and broken vessels were found in the course of the excavation, all of which belong to EBA II (= Beth Yerah III). At a depth of 4 m. some amphorae were found *in situ,* one with bend-slip decoration. On the amphora was a deep bowl with a flat base and two knobs. Inside the amphora were fragments of the bones of an infant. Another big amphora with a flat base was found in the same stratum. Inside it was a large and deep bowl, which also contained the bones of an infant, about one year old, and several ivory beads in the form of mushrooms. Traces of mud-brick buildings were seen in several places. This level belongs to Beth Yerah II. In the lowest level, which reaches a depth of 5.20 m. there were jars, likewise containing child-burials, and sherds with grey-black burnishing, apparently of the Late Chalcolithic Age. In this level there were no traces of buildings. It belongs to the Late Chalcolithic (= Beth Yerah I).

The Fortification of the City of David

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THE much-discussed subject of the fortification of the Hill of Ophel finds its latest treatment in Raymond Weill's second report on his excavation of the City of David.[1] A short summary of the results of the various excavations on the Ophel, published since M. Weill's first report in 1920, is illustrated by a general plan of the site. This plan is a compilation of previous works, showing the walls found by Weill himself and by Guthe, Parker, Macalister and Crowfoot; it has thus every pretension to be up-to-date and to represent the last word on the subject. Unfortunately, however, Weill repeats some commonly accepted but baseless theories, which do not hold their ground upon closer examination and which had already been partly refuted by earlier discoveries.

The object of this paper is to discuss some points in the fortification of the northern end of the City of David, i. e. the main remnants of its walls so far discovered.

The main structural features are: the massive eastern wall with its great tower and north and south ramps, the two supposed 'northern walls', and the west gate (see fig. 1). The last-named, which was uncovered in 1927 by Crowfoot and FitzGerald,[2] has been satisfactorily treated by its excavators, and nothing need be added to their conclusions regarding the date, construction and purpose of this gate. But a reconsideration is indicated of the nature of two partly superimposed and intersecting structures, running in different directions approximately from west to east and thus closing the city area on the northern side. Since their discovery by Macalister and Duncan[3] they have been regarded as the 'Davidic wall' (*D*) and the 'Jebusite wall' (*J*) respectively, and as such they reappear on Weill's latest plan (fig. 1). None the less, all the available data point against their classification as city walls. The so-called 'Davidic wall' (*D*) rests in part upon earlier remains and not on the rock. Its strength and construction (about 1.20 m. thick) are insufficient for a city wall at this most critical

[1] Weill, R.: *La Cité de David*, 1947.—J. Simons, *Jerusalem in the Old Testament*, Leiden, 1952, came to the writer's notice after this paper had gone to press. [2] *PEF Annual* 5, 1927. [3] *PEF Annual* 4, 1923-25.

spot in the city's defences, where, as Macalister pointed out, 'an attacker has the advantage of working from higher ground'. We may assume that the north wall of the city was no less strong than the massive neighbouring walls to the east and west. According to the generally accepted suggestion, the rectangular room at the west end of the 'Davidic wall' represents the eastern tower of the northern city-gate, the corresponding western tower being missing. It is strange, however, for towers to project wholly into the city and to be flush with the wall outside. The most peculiar feature of this 'city wall' is its orientation and oblique position between the eastern and western walls: no satisfactory junction with the east wall of the city is conceivable. As nothing could have prevented the builders from erecting the wall at a more sensible angle, we should look for an explanation of the nature of the so-called 'Davidic wall' on the basis of this very argument of orientation.

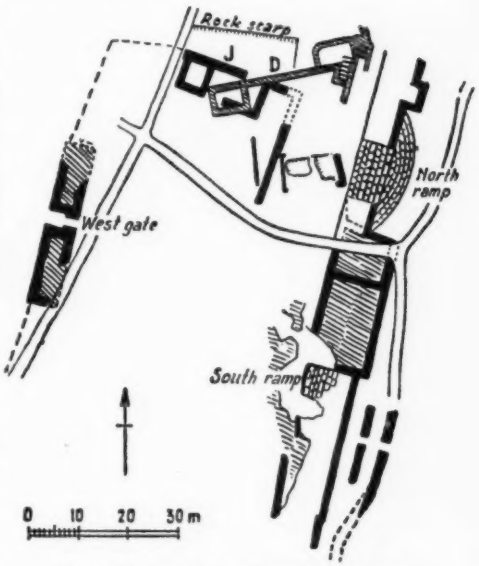

Fig. 1: Plan of the northern part of the City of David (after *Weill*).

It appears that the wall with its 'rectangular tower' and other adjacent rooms[4] fits admirably into the layout of the Byzantine quarter uncovered during the 1927-1929 excavations of Crowfoot and FitzGerald. This is convincingly demonstrated in the plan of the Byzantine quarter of Ophel accompanying Crowfoot's last report, 'Ophel again',[5] which was apparently published too late to be taken into account by Weill.

That the 'Davidic wall' turns out to be merely part of a Byzantine building can be supported by further evidence. The chamber with a stepped cistern on its eastern end, which is for some reason always incorporated into the suggested fortification wall (see fig. 1), is a common feature in a Byzantine level. Some comb-picked stones incorporated into the wall also point to a date much later than the Davidic period, yet they were regarded by Macalister[6] and Watzinger[7] as the earliest instance of the introduction of the mason's toothed instrument.

[4] *ibid.*, Pls. 6-8. [5] *PEQ*, 1945, p. 67. [6] *PEF Annual* 4, p. 82. [7] *Denkmäler Palästinas I*, p. 86.

We now come to the so-called 'Jebusite wall' with its gate and towers (*J* in fig. 1). Here again, the towers are on the wrong side of the wall. The wall turns sharply to the south at some point, and its possible connection with the east wall remains problematical. Actually, very little of this structure was found,[8] and the shape of the 'towers' as shown on the plan is reconstructed. The thin walls (about 1.10 m.) and the inferior quality of the masonry make this structure inadequate for defence purposes. Macalister, who described it as 'a poor piece of work', suggested that it was an inner wall of defence, while a strong outer wall stood, in his opinion, on the rock scarp north of the inner wall. But there only a pile of stones was visible, with no courses *in situ*—and once again, something is on the wrong side. Macalister writes: 'It will not escape notice that the scarp is on the wrong side of the wall for defence; it faces inside the city, whereas common sense would seem to require it to be outside'.[9] Nevertheless, he stuck to the idea of an outer wall on this very spot. It is most likely that both rock scarp and rock trench, supposed to be part of the defence system, are later work. Thus the 'Jebusite fortification wall' we have discussed is to be regarded as nothing more than some portions of an ordinary house, and may be assigned with Crowfoot[10] to a date somewhere in the Roman Period.

Deprived of both the 'Jebusite' and the 'Davidic' walls, we are faced with the question of the whereabouts of the north wall of the City of David. No conclusive answer to this question can be given without further excavation. The massive defence structures, 8 m. thick each, covering the narrowest part of the City (about 55 m. inner width) from the east and west, have a fortress-like appearance. This seems to indicate that we are close to the northern border of the city, which is naturally the one most exposed to attack. The ground in this direction is rising, in contrast to the steep slopes surrounding the rest of the city, where defence walls of lesser strength sufficed. We may therefore suppose that the north wall of the City of David is not far away from that portion of the northern edge of the east wall so far uncovered. A dig in field 3 (see fig. 2) might solve this highly important topographical problem.

Another feature of the fortification which has not yet been a subject of discussion, but which has never been satisfactorily defined, is the famous 'Jebusite ramp' or 'Jebusite bastion'. Macalister and Duncan, the excavators, distinguish between the 'north bastion' and the 'south bastion', which are separated by a

[8] *PEF Annual* 4, Pl. 5. [9] *ibid.*, p. 47. [10] *PEQ*, 1945, p. 75, n. 1.

square tower. The nature of the 'north bastion'[11] (or, more correctly, ramp) is well known, and we need not go into details here. The sloping structure (7 m. high), composed of step-like courses, abuts on to the massive wall and is not bonded to it. The lowest course starts at *A* (see fig. 2) from the face of the wall, and continues for about 13 m. in a convex line, stopping at *B*, about 4.5 m. east of the wall. Here the ramp is broken up, and for another few metres only confused masonry was found. In the excavators' proposed reconstruction of the 'north ramp' its curved line is continued in a south-westerly direction back to the wall, thus giving the structure a segment-like plan.[12] This conjectural restoration reappears in Weill's plan, and since little sense can be made of a ramp of such a shape, it is little wonder that among various suggested interpretations one finds the idea that it may have been a stepped ascent leading to a platform on the city wall.[13]

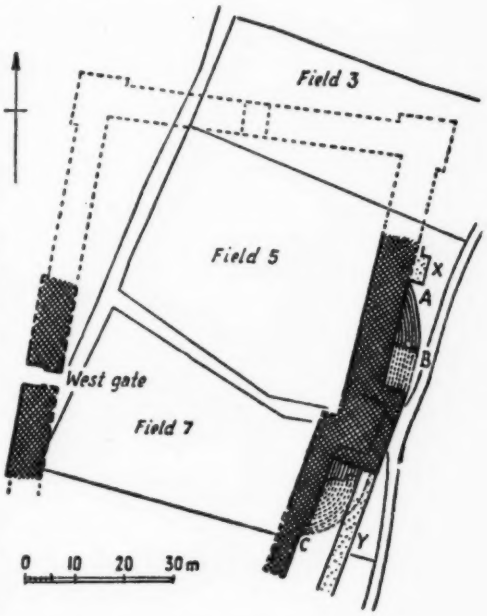

Fig. 2: Plan of the northern part of the City of David; with proposed restorations.

It is generally considered certain that the purpose of the 'Jebusite ramp' was to strengthen the wall behind it and to elaborate the defence system, as glacis always do. Duncan explains the necessity for this structure by the fact that at point *A* of the wall there is a break in the continuity of the rock, and the rock-scarp face turns westwards. To enable the wall to continue on a straight course, he says, the hollow or fissure was filled in with great boulders as a substitute for rock. On these boulders the wall rests; they form at the same time the background of the bastion. Therefore, concludes Duncan, the 'bastion' was built to strengthen the foundation of the wall at this point. It seems obvious, however, that a ramp of the shape proposed by the excavators covering only a roughly triangular patch of wall, would be of little use as a strengthening factor.

[11] *PEF Annual* 4, fig. 47; plan facing page 49; general plan.
[12] *ibid.*, Pl. 5.
[13] Weill, *op. cit.* (supra, n. 1), p. 30.

The next portion of wall, which stands once again on the rock-scarp, is at the junction of Field No. 7 and Field No. 9 (*C* in fig. 2), where the rock-scarp which vanished at *A* reappears.[14] It seems that for the reason mentioned above, namely, the strengthening of the wall, the whole stretch of wall from *A* to *C* must have been faced with this sloping revetment. Thus, to start again from the large remaining portion of the 'north ramp', we must assume that the ramp continued from point *B* in a southerly direction parallel to the line of the wall, reaching the north face of the square tower with all its courses (fig. 2). This suggestion is confirmed by the remains of the 'south ramp', where several stepped courses have been found abutting on the south face of the tower. From there, according to Macalister-Duncan, this ramp swept round to the south-west until it joined the wall standing on the scarp at point *C*.

There is reason to believe that the ramp had a continuous run underneath the tower. Describing the construction of this tower, Macalister writes: 'The south end (sc. of the tower) rests on the steps of the south bastion, and the tower seems to have overlapped this bastion for some distance'.[15] On the north face of the tower a line of a sloping glacis can be traced,[16] where the excavators clearly distinguished two kinds of masonry, one of the glacis (which is described as having a straight sloping surface) and the other of the superimposed tower. Unfortunately, no sectional drawings of these structures are available which might enable us to establish the exact relation between the 'north ramp' and the 'ordinary glacis' beneath the square tower. As things look, a connection between them is most likely, and the existence of a continuous sloping revetment from *A* to *C* at some date is evident. At a later date it was found necessary to build the square tower, which rests in part upon the remnants of the glacis. This reinforcement may have been rendered necessary by some failure at the bend of the city wall,[17] where the massive structure on the north joined the much thinner wall on the south. Nothing is left of this joint, but it is evident that the south wall recessed towards the west.[18] The sketch-plan in fig. 2 is based on scattered material published in rather inadequate form by Macalister and Duncan in their report. In this connection, attention should be drawn to the strange form and proportions of the tower, and the location of the 'south ramp',

[14] *PEF Annual* 4, p. 61. [15] *ibid.*, p. 57. [16] *ibid.*, fig. 48.

[17] The excavators' suggestion that the tower might have been built to block an opening in the wall which had become unnecessary (*op. cit.*, p. 59), sounds most unlikely.

[18] Owing, according to Duncan, to the receding rock-surface.

as they appear on Weill's plan (fig. 1). One is unable to explain their extension so far to the south, in defiance of every measurement supplied by the excavators.

Whereas the continuing use of the west gate from the time of the Jebusites until the days of the Hasmonaeans has been stratigraphically ascertained by Crowfoot, the exact date of the eastern defence-structures remains uncertain. The massive wall and its sloping revetment were related by Macalister to the Jebusites, whereas most scholars nowadays assign them to the reign of David.[19] The regularly laid courses of the revetment seem to preclude a date earlier than the tenth century B. C. The solid stone glacis is a well-known feature of the Israelite period, as, for example, in the fortifications of Tell el-Ful (Gibeah of Saul),[20] Megiddo[21] and Tell en-Nasbeh.[22] The revetment on the Ophel shows two peculiarities. Firstly, it revets only a stretch of the city wall, or isolated parts of it, so far as is known. Secondly, its sloping surface is not straight but stepped. This unusual arrangement would make it easy for a possible attacker to climb the wall, unless some special precautions were taken. The great tower is frequently regarded as a Solomonic addition, but it could equally well be one of the undertakings carried out by later kings to strengthen the defence line of the city. King Uzziah, for instance, is known to have built towers in Jerusalem, and one of these he built 'at the turning of the wall' (2 Chron. xxvi, 9).

There remain to be mentioned two more features shown on the plan in fig. 2. The small tower north of the ramp (*X*) was convincingly demonstrated by Macalister to be a post-Exilic (Maccabean) addition.[23] The wall running from the south-east corner of the great tower in a southerly direction (*Y*) is called by the excavators 'the outer wall', and is assigned by them to the period of the Kings.[24] But this wall, the foundations of which rest near the tower on the steps of the 'South ramp', was obviously built when the ramp lay in ruins and the wall to the west of it was out of use. This indicates that it was built after a major destruction of the city wall, and one would therefore be inclined to attribute the 'outer wall' to the rebuilding of Nehemiah. The builders made use of the still standing tower and built the wall flush with it. One would expect so out-

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[19] Cf. W. F. Albright, *Jew. Quart. Rev.*, 1930, p. 108; Watzinger, C.: *Denkmäler Palästinas*, I, p. 86.
[20] W. F. Albright, *Ann. Amer. Schools Orient. Res.*, 4, 1923-4, p. 79.
[21] Lamon, R. L. & Shipton, G. M.: *Megiddo, I*, 1939, fig. 81.
[22] Our ramp is particularly reminiscent in plan of some parts of the glacis of Tell en-Nasbeh; cf. MacCown, C. C.: *Tell en-Nasbeh*, 1947, general plan.
[23] *PEF Annual* 4, pp. 50-51. [24] *ibid.*, pp. 65 ff.

standing a feature as the large tower to be recorded in the story of the repair of the city wall, and its identification by Duncan[25] with 'the tower that lieth out' (Nehemiah iii, 26) is quite plausible. This very identification, however, excludes a pre-Exilic date for the 'outer wall', for, were it pre-Exilic, the tower would not have been 'outlying' when Nehemiah started to rebuild the city wall.

[25] Duncan, J. G.: *Digging up Biblical History*, I, 1931, p. 196.

Ottoman Rule in Jerusalem in the Light of Firmâns and Sharî'a Documents

Preliminary Note*

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IT IS an astonishing fact that relatively little is known about the Ottoman period in Palestine, in spite of the interest which the Holy Land and its history have always aroused among Jews and Christians alike.

The Arab historians and biographers were not overmuch concerned with the small land bridging the two big cities of Cairo and Damascus, the destination of learned men and ambitious officials born in Palestine. For Western scholars, the Ottoman period seemed less significant than the days of the Crusaders and of their adversaries, the Ayyûbids and Mamelukes. It was known that records of great value were stored in the Ottoman archives in Istanbul, but until the first decades of our century no attempt was made to exploit them for scientific purposes.

It is now the intention of the Turkish Government and its scholars to make the archives accessible for research, by proper classification and cataloguing. We would like to emphasize the great service to scholarship performed by Turkish scholars, who have in recent times published some relevant material elucidating this interesting and little-known chapter in history. But it is clear that, owing to the abundance of material pertaining to the Turkish provinces proper which wait for exploration and exploitation, the attention of our colleagues to documents of the so-called Arab provinces can only be perfunctory, at least for the time being. It is therefore lucky that in the last few years Western

* A paper on this subject was read by the present writer at the 22nd International Congress of Orientalists at Istanbul, in September 1951. In the meantime new documents have been found, and preparations for the publication of a larger study are now well advanced. In view of this, the plan of the present article has undergone some changes. Only the general features remain and the critical discussion in the light of other sources has been omitted. For the same reason references to these materials have been reduced to a minimum. In view of typographical difficulties diacritic points have been dispensed with in the transcription of Arabic and Turkish words.

scholars too have had access to these sources, and we may hope that their work will soon enrich our knowledge, especially of the first centuries of the Ottoman conquest.[1]

A start has also been made with the publication of the records of the local Sharî'a Courts in Jerusalem, Nablus, Jaffa and other towns, and the orders and instructions given by the headquarters of the civil administration in the days of Mohammed 'Ali Pasha.[2] We have heard nothing of any plan of serious research into the local archives for records of the times before Mohammed 'Ali.

It is to our advantage that we have publications of sources concerning the activities of the Catholic orders in Palestine and some small Christian communities.[3] In addition, scores of diaries and accounts have been published by pilgrims and travellers who visited the country in Ottoman times. With few exceptions, they are monotonous and formalized descriptions of visits to the Holy Places. Only a few remarks and observations of general importance can be found there, and even these have not yet been collected and studied.

Two other types of subsidiary sources, neither of which has as yet been properly explored, are therefore the more important. They are the firmâns and records of the Sharî'a Courts in the hands of Jewish owners, and the Rabbinical responsa (Jewish *fatâwî*).

The archives of the Sephardic Community of Jerusalem, whose tradition goes farther back than that of the other Jewish communities, contain a number of Arab and Turkish documents dating from the period of Ottoman rule.[4] Similar documents are in private possession. Altogether, the Research Institute on Jewish Communities in the Middle East, at the Hebrew University, has collected about two hundred records, consisting of originals and certified copies or photocopies of such extant documents; there are also a small number of photocopies found in the files, the originals having been taken out probably twenty or thirty years ago for submission to the authorities, and never returned to their owners. Among the records is a number of firmâns—originals as well

[1] Cf. Lewis, B.: The Ottoman Archives as a Source for the History of the Arab Lands, *Journ. R. Asiat. Soc.*, 1951, pp. 139-154; idem: *Notes and Documents from the Turkish Archives*, Orient. Notes and Studies, 3, Jerusalem, 1952. As Prof. Lewis kindly informs me, some other studies based on materials from the Istanbul Archives are to be published shortly.

[2] Cf. Asad Jibrail Rustum: *Materials for a Corpus of Arabic Documents Relating to the History of Syria under Mehemet Ali Pasha*, I-V, Beirut, 1930-34; cf. also idem: *The Royal Archives of Egypt and the Origins of the Egyptian Expedition to Syria 1831-1841*, Beirut, 1936.

[3] E. g. Cerulli, E.: *Etiopi in Palestina*, I-II, Rome, 1943-1947.

[4] I wish to thank Dr. U. Heyd and Mr. M. Lebanon for the translation of some Turkish documents.

as official copies—and several orders addressed by the Wâlîs to the administrative authorities in Jerusalem and Jaffa. Most of the material, however, consists of court decisions and verdicts, notices, court records—including the record of an inquest into a case of sudden death,—purchase-deeds, contracts concerning the payment of debts, receipts and other records of the Sharî'a Courts of Jerusalem. The dates range from 944 H./1537 to the very end of the 19th century.

It is the aim of this paper to give a short preliminary report on the contents of these documents, anticipating their publication, which is now being prepared. We shall devote our attention to those ending with the reign of Sultan 'Abd al-Majîd I, that is roughly the middle of the 19th century, the later records being of less interest for our present purposes.

Obviously, our collection is accidental and far from complete, nor does it give a continuous record of the activities during the past three hundred and eighty years. However, many of the records contain fairly full references to previous orders, court decisions, deeds and contracts. Their main value lies in the fact that they verify and supplement the information contained in contemporary travellers' reports and in the Rabbinic responsa. There we see claimants and defendants, oppressors and oppressed, qâdîs, pâshâs, sanjaq-beys, sû-bâshîs and other representatives of the Empire, parnassim, officials and spokesmen of the Jewish community—but always quite anonymous. Those records which are exactly dated, on the other hand, mention them with full names, and help us to clothe these abstracts with flesh and blood.

The collection consists of documents belonging to one religious community, but it yields material of general importance, and mirrors faithfully contemporary conditions in Jerusalem. While the documents throw their main light on the status, rights and privileges of the Jews, the information is valuable for the history of all communities living in Jerusalem, despite differences in detail or special privileges granted. The documents illustrate not only the legal position of all the ahl al-dhimma, the 'people of protection', but also, to a certain extent, the social and economic structure of the non-Muslim communities. These usually consisted of two distinct sections: (1) the indigenous population, who earned their living by manual work and trade; (2) the newcomers who often outnumbered them. These latter were mostly ecclesiastics—rabbis, priests and members of religious orders—who had come to Palestine impelled by religious motives. Jewish sources can therefore be supplemented and completed by Christian documents. There is a similarity especially in the conditions of the

Jewish and Greek-Orthodox communities, for both had a similar organisation.

Let us now turn to the documents themselves.

The earliest document is a court decision given in the month of Jumâdâ II 944 (Oct. 1537) by the Qâdî of Jerusalem and Hebron, 'Abd al-Rahîm (or Rahmân or Ra'ûf, the document is slightly damaged) ibn Ibrâhîm al-Othmânî al-Hanafî, in the matter of the claim of the Sayyid Tâj al-Dîn b. al-Sukarî al-'Âmil, viz. an administrator of Imperial domains (Pl. 20). The claimant showed the Qâdî a tadhkira of the new daftar khâqâni (cadastral survey) drawn up on the 2nd of Rabi' 944, according to which he was nominated administrator of a khâs sultâni (Imperial Domain) in the Holy City of Jerusalem, including lands of the Salâhiyya waqf. The Salâhiyya administrators, on the other hand, submitted the sharî'a and qânûnî documents showing that the land in question belonged to the waqf and had a Jewish cemetery within its boundaries. In addition, they called witnesses of the Mâlikî and Shâfi'i rites (but not the Hanbalî rite), and sheikhs and preachers of the al-Aqsa Mosque, who testified to the boundaries of the Salâhiyya lands before and after the khâqâni conquest. Accepting this testimony, the judge rejected the claim of the administrator.

An analysis of many details mentioned by the way shows the hujja (title-deed) to be a fine sample, illustrating the method of compiling cadastral surveys, known as daftar khâqâni.[5] It has been preserved by the Jewish community, incidentally only, because it seems to be the oldest legal document in which their cemetery is expressly mentioned.

In another document registered by the Shâfi'î, Qâdî, from the year 1059/1649, concerning the lease for burial purposes of parcels of land belonging to the Salâhiyya waqf the legal form is ten continuous contracts, each for a period of three lunar years. An old hujja from the year 969/1561 is mentioned. In a similar case (1098/1686) the period of three hundred years since the first use of the plot as a cemetery is mentioned.[6]

Housing in their lifetime and a resting-place after death always presented a serious problem to the non-Muslim inhabitants of Jerusalem. Most of the houses and plots within the city walls repaired by Sultân Sulaiman al-Qânûnî, and most of the land surrounding the city—especially in the east, which is tra-

[5] Cf. Lewis, *Journ. R. Asiat. Soc.*, 1951, p. 144 f. A Hebrew translation of the document has been published by Y. Ben-Zvi: חמדת ישראל, לזכרו של ר' חיים חזקיהו מדיני, Jerusalem, 1946, p. 85-89.

[6] In another hujja, of the year 1111/1699, a firmân issued before 1097/1685 is referred to. A deed from 1127/1715 is based on the status at the time of the Ottoman conquest, and on a hujja from the year 967/1559.

ditionally hallowed as the place of the Last Judgment—had belonged to Muslim waqfs since the conquest of Jerusalem by Salâh al-Dîn.[7] Plots and houses were let on short-term contracts by the waqf administrators, and the conditions of lease underwent frequent changes. In this respect, the position of the Jews who came to settle was more difficult than that of the Christians, who usually visited Palestine for a number of weeks or months only, and found lodgings in the numerous convents.[8] Against this background of leases, and other contracts, burial permits, rights of way, ownerships rights, claims and so forth, conflicts arose very easily, and claims were submitted to the Sharî'a Courts by both sides, the lessor and the lessee. Sometimes a third interested party appeared—the neighbours, or the villagers of Silwân just outside the city walls. According to the Shar', the period of legal action is limited to 30, 33, or 36 years from its accrual. As this period was considered too long, the Ottoman Sultâns curtailed it to 15 years, and firmâns of the years 1146/1733 and 1174/1760, ordered the Jerusalem qâdîs to follow this qânûn. However, while this measure reduced somewhat the volume of court cases, it did nothing to prevent their submission for a number of other reasons. Thus, for instance, in another firmân dated 1206/1791, we read of a complaint made by Jews against their landlords —a Muslim waqf owned by Irâqîs—who were harassing the tenants in order to force them to leave the house. An Imperial order had already been issued in 1171/1757 confirming the rights of the Jews. Now (35 hijra years later) new arguments had been produced against the tenants. The Jews were accused of lighting candles, reading the Torah and holding prayers in the house, thus using it as a synagogue, although the terms of the ahl al-dhimma forbade the opening of new places of worship. The firmân of 1206/1791 reaffirms the validity of the first firmân 35 years earlier, and orders the Qâdî to prevent further interference with the tenants and to reject complaints in this matter.

Quite a delicate matter is discussed in a firmân of the year 1135/1722. The (Jewish) administrator of a Jewish endowment, dedicated for housing the poor, sold it to a Muslim. After the death of this new owner, a new administrator claimed the return of the property, in accordance with the conditions of the waqf. After failing to obtain a clear decision in the Sharî'a Court, he brought the

[7] Cf. Mujîr al-Dîn, *al-Uns al-Jalîl*, pp. 345, 487, also 411 and 339, where dates concerning the endowment of al-Salâhiyya and of some family waqfs in Jerusalem and on Mt. of Olives can be found.
[8] All Frank (=Western European) pilgrims, 'Papals' and 'non-Papals' alike, used to stay in the Latin convent belonging to the Franciscans. The Eastern Churches had their own hostels.

matter before the Sublime Porte. A fetwâ from the Sheikh al-Islâm ruled that the conditions must be adhered to, and the Qâdî was ordered to look a second time into the matter and if the claims were well founded, to return the houses to their former owners.

To the second half of the 18th century belongs a fetwâ of Najm al-Dîn al-Khairî, the Hanafî Muftî, which permits, in accordance with the fiqh, the repair of a collapsed synagogue wall and of an adjacent beth midrash wall. The fetwâ is not dated, but we come across the name of this Muftî in two other documents of the period. His signature appears as an endorsement on a contract of sale dated 1169/1755 for a plot of land to be used as a Jewish cemetery, the hikr to be paid compulsorily to the Salâhiyya waqf. The second document is a complaint submitted in 1173/1759 against the validity of this contract by a third party, who wished to prevent the Jews from burying their dead in this cemetery on various grounds, claiming, for instance, that the land in question did not belong to the Salâhiyya. The Qâdî, in rejecting the complaint, refers to two fetwâs of the Muftî Najm al-Dîn al-Khairî, which rule that according to the principles of Muslim religion, the ahl al-dhimma must be allowed to bury their dead in honourable conditions. In this particular case, the complaint of the third party is rejected because the ahl al-dhimma have the same rights to buy and sell as the Muslims.[9]

Even in later times cemetery cases are the subject of several orders of the civil authorities. In one case barley had been sown, apparently in order to turn the cemetery into cultivated land and thus evict the owners. In 1188/1774 the Mutasarrif of Jerusalem ordered the barley to be uprooted and salt strewn on the land. Two orders, identical in content, were issued by two Qâimaqâms of Jerusalem in 1200/1786 and in 1201/1787 concerning the right to use the cemetery.[10] They quote a fetwâ of the Sheikh al-Islâm in Constantinople and a firmân. On another occasion some Armenians interfered with the use of the cemetery, and the Wâlî of Damascus issued an order to the Mutasallim of Jerusalem and Jaffa (1238/1823), enjoining him to safeguard the rights of the Jews.[11]

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[9] This liberal attitude changed in the thirties of the nineteenth century as regards the Jews, cf. Rustum, *Materials*, III, p. 65 (No. 215); but not as regards the Christians, cf. *ibid.*, p. 270 (No. 498).

[10] Between 1774 and 1786 another attempt was made by certain Muslims to expropriate a part of the cemetery on the Mt. of Olives. A special emissary went to Western Europe with the task of raising the large sum of money needed to avert this disaster; cf. Yaari, *A.: Emissaries from Eres-Israel*, Jerusalem, 1951, p. 549 f. (in Hebrew).

[11] But we find that such cases were also heard by qâdîs; cf. Rustum, *op. cit.*, p. 30 f., No. 186.

A number of documents of the same period dealing with matters of worship have been preserved. Thus, in 1243/1827, the Qâdî of Jerusalem applied to the Wâlî of Damascus for a permit to repair a synagogue wall which was liable to collapse and injure passers-by.[12] Three years later, another Qâdî wrote to the Wâlî and recommended that the Jews be allowed to visit Rachel's Tomb, since this was their right by precedent. A favourable answer from the Wâlî to the Mutasallim of Jerusalem and Jaffa, dated several weeks later, has been preserved as well.

Another problem which harassed the non-Muslim communities was the tax levied on the distribution of inheritances.[13] Without the qismet—as Jewish sources call the receipt obtained upon payment of this tax—the dead could not be buried. The qâdî or qassâm, the official charged with the distribution of inheritances and the granting of permits, often abused his powers and demanded larger payments, threatening to delay the burial. An Imperial order dated 1156/1743 expressly forbids this practice. Nineteen years later (1176/1762), however, it became necessary to renew the order, and this time it was entered into the files of the Sharî'a Court and signed by all the qâdîs then in Jerusalem. It is of interest to note that the order mentions Jews and all the ahl al-dhimma and ra'âyâ.

It appears that this tax was felt to be especially burdensome because its levying was sometimes unfair. The Imperial orders had to be repeated many times; a firmân dated 1208/1793 cites those issued in the years 1174/1760 and 1189/1775.

Another tax which caused trouble was the khafâra, the protection duty and entrance-fee collected from pilgrims and other non-Muslim travellers in Palestine. We already have knowledge of this toll from the Mameluke period onwards. Officially it was not very high when compared with the other expenses

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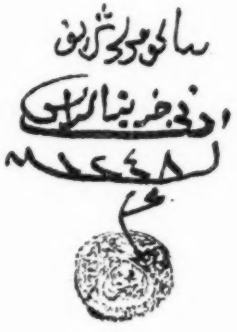
[12] Rustum, *op. cit.*, II, p. 141 (No. 148); p. 156 f (No. 156); III p. 24 f. (No. 183) published records relating to the repair of churches and synagogues. Material from 1845-1863 has been published by E. Cerulli, *op. cit.* (supra, n. 3), II, p. 214-255.

[13] From the rich material on this problem we would like to quote two sources: Pietro Casola: *Pilgrimage to Jerusalem in the Year 1494* (edited by M. Newett, Manchester, 1907), p. 241, describes how a pilgrim was buried in Ramle 'as secretly as possible'. For a permit to bury a German pilgrim on land 'those dogs... insisted on having ten ducats', *ibid.*, p. 290; comp. also *ibid.*, p. 223. After the death of an European merchant the Druze Emir Fakhr al-Dîn used to seize his goods and release them only after payment of their value in cash; *Sandys Travailes*, London, 1652, p. 165. Comp. also the relevant provisions of the Qânûnnâme Misr from the time of Suleiman I; Hammer: *Des osmanischen Reichs Staatsverfassung und Staatsverwaltung*, I, Wien, 1815, p. 128; see also *ibid.*, p. 434.

of an European traveller in Palestine, but the local authorities were wont to raise it arbitrarily, and to add various imposts and charges such as the timber tax, the wool tax, the impost for armed guards, etc., so that the actual sum paid was greatly in excess of the official rate of one and a half Asadi piastres. In consequence, complaints would now and again reach the Imperial court, and as a result firmâns (1138/1725; 1147/1734; 1182/1768; 1190/1776) would be sent to the qâdîs of Jerusalem. This detail is particularly interesting because it shows that the qâdîs apparently had authority over the collection of taxes and fees, although the governor's treasury received the proceeds of this toll.[14]

As a curiosity we may give here the facsimile (fig. 1) and translation of a jizya (poll-tax) ticket found in a family archive:



. . . . ? the right of the noble lord (=qâdî)

Hereunder (appears the acknowledgement of receipt of) the two jizyas (!) of the head

for the year 1248 (=1832-33)

Muharram (=31 May to 29 June 1832)

L. S.
(see better reproduction Pl. 20 B)

Nissim son of Lea Jew نسيم ولد ليا يهودي

high-grown; pale; eyes yellow; beard fair.[15] طويل القامه اسفر اللون عيون صفر ذقن شقرا

Fig. 1

In connection with the traffic of pilgrims and visitors, the problem arose of accommodation for them on their arrival in Jaffa and during the customary stay in Ramle. This was finally solved in the twenties of the nineteenth century,

[14] Cf. Volney, C-F.: *Travels through Syria and Egypt*, London, 1788, II, p. 306.

[15] The ticket is written in vernacular Arabic. Cf. an amusing comment on the meaning of 'jizyat al-ra's' by Volney, *op. cit.*, p. 399. I have to thank Mr. M. Parnass for his kind permission to copy some interesting documents in his possession, including this poll-tax ticket.

as is evident from an order issued by the Mîrmîrân of Tripoli and Qâimaqâm of Damascus to the Mutasallim of Jaffa in 1238/1823,[16] and a purchase-contract for a house in Ramle dated 1236/1820.[17] In both cases, the administrator of the house concerned acted as owner and responsible caretaker of the hostel in the name of the Sephardic Community of Jerusalem, just as the Guardian of the Franciscans in Jerusalem was in charge of the convent-houses at Jaffa and Ramle.

Many documents and records deal with the debts of the Community. For the history of usages at the Sharî'a Courts, it may be a pity that no complete file of one case has been preserved, showing the proceedings from the moment the parnassim received the money until its repayment and acknowledgement thereof, often given by successors of the creditors before the Sharî'a Court. But for general history, it is quite enough to have a collection consisting of orders regulating repayment by instalments, with the rate of interest, detailed lists of creditors and the sums to be paid every year in accordance with the agreement. Finally, we possess what seems to be the oldest hujja (1126/1714) preserved in a matter of debt, containing some three hundred names of creditors and their witnesses, who certified before the Court the receipt of the large sum of thirty-four thousand piastres from the hands of a well-known Rabbi and scholar. In this case we have plain evidence that the money was sent by the Jewish Community of Istanbul.

About the background of these debts, how they arose, and for what purpose the money was used, we learn from literary sources.[18]

As we have touched on taxation problems, some further records may be mentioned:[19]

An administrative decision issued by the Qâimaqâm of Jerusalem in 1177/1764 abolishes the illegal impost levied by a certain Muslim on the import and export of goods to and from Jerusalem. The document mentions that judgement was given in the presence of the Amîr Lây of the Sanjaq of Jerusalem. In its form it closely resembles a decision of the religious courts, with the usual

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[16] This order is discussed in the writer's paper: Beginnings of the Revived Jewish Settlement at Jaffa, to be published in *S. Assaf Jubilee Volume*, Jerusalem, 1953, pp. 223, 229 (in Hebrew).

[17] The contract is analysed in the writer's article: Ramle, the Intermediate Station on the Road to Jerusalem, published in Volume IV of the Quarterly *Jerusalem*, dedicated to Isaiah Press, Jerusalem, 1952, pp. 123-128 (Hebrew).

[18] Cf. my article: Notes on the Debts of the Jews of Jerusalem in 1775, *Eretz-Israel*, Annual of the Israel Exploration Society, 1, 1951, p. 158-168 (Hebrew), where one of these documents is published.

[19] Others which demand longer explanations have been omitted here.

signatures of witnesses, the difference being that the 'alâma is below.[20] The abolition of illegal taxes is also mentioned in an order (fig. 2) of the Amîr al-hajj (the Wâlî of Damascus) Salâh, dated 1243/1827, to the Mutasallim of Jerusalem, whose name was apparently unknown to the official, as he left the space blank.[21] In the margin is an endorsement of the order by the new Wâlî, Muhammad Râ'ûf, dated a year later (1244/1828).[22]

Fig. 2. Facsimile of the order dated [1]243/1828 and [1]244/1829.

In all records we meet the Jewish representatives — parnassim, administrators, plenipotentiaries, dragomans — and obtain a clear picture of their activities and tasks in defending their community. Some parnassim appear in different cases and we have a chance to follow them for many years. But as only personal names (sometimes arabicised) and fathers' names are given, it is sometimes difficult to identify them, especially as it is the custom of the responsa to use conventional names (Reuben, Shim'on, Levi, etc.) instead of the real ones.

The activities of the parnassim sometimes aroused criticism. Among the documents is an order from the year 1184/1770 forbidding a dragoman who was abroad to return to Jerusalem.

The documents throw a good deal of light on the changes in the adminis-

[20] The record is to be published in a Memorial-Volume for L. Freund.

[21] From many orders published by Rustum, *Materials*, (e. g., I, p. 87-89, No. 36) we learn that it was not easy to abolish such avanias.

[22] I would like to draw attention to the fact, that the place of the pence in all our documents is different from that in the documents published by I. Deny, E. I., s.v. Tughra, fig. 16-38.

tration of Syria and Jerusalem from the end of the 18th century onwards. Instead of firmâns we now find orders of the Wâlîs of Damascus. The independent mutasarrif of the district is replaced by the mutasallim, and the local qâimaqâm is no longer mentioned in the 19th century. We have already seen that the higher officials changed very frequently. Of particular interest in this respect is an order issued on the 16th of Rajab 1238 (30 March 1823) to Hâjj 'Alî, the Mutasallim of Jerusalem and Jaffa, by Muhammad Darwîsh, the Wâlî of Damascus. Eleven days later (27th of Rajab 1238—10 April 1823) another order is addressed to the same Hâjj 'Alî—here called Mutasallim of Jaffa only—this time by Hâjj Husein, Mîrmîrân of Tripoli and Qâimaqâm of Damascus.

The court records afford an interesting insight into the social and economic structure of Muslim society. Since the reasons bringing the parties before the courts were usually of the most commonplace, such as conflicts over land or contracts, we have an opportunity of meeting the Muslim religious leaders, the muftîs and qâdîs, and in particular the administrators of the many waqfs of the city and its environs. We meet the common people too, moneylenders and villagers of Silwân, who sold plots of land for the cemetery or for secular purposes. Of the officials of the qâdîs, acting on their behalf, we would mention: the qassâm (cf. supra, p. 243), the sû-bâshî and bölük-bâshî (police officers), the mu'ammir-bâshî (chief engineer or architect), the hakîm-bâshî (chief physician).

It is beyond the scope of a preliminary article to analyse the procedure of the courts as reflected in the documents, a procedure differing from that in use in the preceding period. In many of the documents we find, in addition to the signature of the qâdî who heard the case, the signatures of qâdîs of other rites, and endorsements of the muftî. The commonest form of endorsement is that of the Shâfi'î Qâdî or Muftî. While it is true that the Hanafî Qâdî ranked first under Ottoman rule, most of the inhabitants, particularly of Jerusalem, and the administration of the great and famous Salâhiyya waqf followed the Shâfi'î rite. There are also some documents bearing the endorsements of several or all qâdîs and of other notables, in addition to the usual witnesses' signatures.

To sum up: the collection of Jerusalem documents at the Research Institute on Jewish Communities in the Middle East, incomplete as it is, gives a vivid picture of life in Jewish Jerusalem under Ottoman rule. It was the life of a community amounting sometimes to one third of the inhabitants of the Holy

City. Specific problems connected with their status as non-Muslims, and sometimes foreigners, had to be solved in various ways. It was not an easy life for the pious who immigrated from other countries to spend their last days in the precincts of the Holy Places. The documents give evidence of a tolerant attitude on the part of the Ottoman secular rulers and Muslim religious officials. But life was hard for all, and the Jewish notables in Jerusalem had to struggle continually to maintain the status of their Community and to defend the rights of its members in the Sharî'a Courts and government offices in Jerusalem, Damascus and Istanbul.

NOTES AND NEWS

THE outstanding scientific event of the period under review was the INTERNATIONAL SYMPOSIUM ON DESERT RESEARCH held on 7-14 May 1952 under the auspices of UNESCO, and arranged by the RESEARCH COUNCIL OF ISRAEL. The symposium was attended by some 45 scientists, representing fifteen different countries and such international agencies as UNESCO, FAO, WHO and IGU; they were joined by a number of local scientists, headed by Prof. S. Sambursky, Director of the Research Council of Israel.

Sectional meetings. Following the official opening session in Jerusalem, May 8th, 9th and 10th were devoted to sectional meetings. From among more than 25 lectures only a few can be mentioned here: Prof. J. B. Leighly was the first lecturer, dealing with *Dry Climates, their nature and distribution.* Dr. C. E. Kellog lectured on *Potentialities and Problems of Arid Soils;* he laid particular emphasis on the complex nature of the problem of reclamation and development in arid and semi-arid areas. The problem requires the integrated work of experts in a variety of subjects, no less than the firm backing of a determined and competent administration. Dr. C. W. Thornthwaite lectured on *The Water Balance in Arid and Semi-Arid Areas,* and Mr. S. Duvdevani on *Dew Gradients as an Indication of Topography, Soil and Climate in Arid Areas.* Particular interest was aroused by Dr. W. S. S. Ladell's lecture on *The Physiology of Life and Work in High Ambient Temperatures.*

Among lectures in the Biology section were the following: Dr. P. W. Went: *The Effect of Rain and Temperature on Plant Distribution in the Desert;* Dr. B. T. Dickson: *Plant Introduction;* Sir Harold Glover: *Aspects of Dry Zone Forestry;* Dr. H. G. Thornton: *Problems of Soil Microbiology relating to Arid Regions;* and Prof. M. Evenari: *The Water Balance of Plants in Desert Conditions.*—In the section on Soil Prof. G. Aubret lectured on *Problèmes pédologiques de l'irrigation des sols arides dans le Delta Central Nigérien;* Prof. E. S. Hills on *Regional Geomorphic Patterns in relation to Climatic Types in Dry Areas,* and Dr. W. C. Lowdermilk, President of the Symposium, on *Floods in Deserts.*

Excursions. May 11th to 13th were devoted to excursions through various parts of the country. The first day led from Beersheba southwards, to the sites of Nabataean and Byzantine settlements at Shivta (Sbeita) and Mamshit (Kurnub) (2nd century B.C. to 8th century A.D.). The area of these extensive sites, ancient methods of cultivation and irrigation, and the soils, vegetation and types of desert-pavement in the northernmost part of the Negev were studied.

The second day gave members of the Symposium an opportunity to study various Soil Conservation Projects as well as an experimental water reservoir north of Beersheba. After a visit to the Weizmann Research Institute and Agricultural Experimental Station at Rehovot the party proceeded to Haifa.

The last day of the trip gave members the opportunity to study different parts of Northern Israel. First came the *'Emeq* (Esdraelon Plain), followed by the intensively cultivated area south of Lake

Tiberias, where special attention was paid to banana plantations. Whereas both these areas were already settled two generations ago, a bird's-eye view of the Huleh Plain from the mountains of Galilee afforded an instructive view of an area whose reclamation and settlement are just about to begin. The return journey to Haifa through the central part of Upper Galilee led through some of the most intensively cultivated mountain districts of Israel with their cultivation-terraces and ancient olive-groves.

Haifa Session. The Symposium was concluded at Haifa with meetings of the section on Water and Energy, where, inter alia, the following lectures were delivered: Dr. P. Danel: *The Measurement of Underground Water Discharges;* Dr. L. A. Richards: *Water Conducting and Retaining Properties of Soils in Relation to Irrigation;* and Dr. M. G. Drouhin: *Aspects divers de l'hydrologie en regions désertiques.*

Resolutions. The resolutions adopted by the Symposium urge the strengthening of national research centres engaged in arid zone research, adequate arrangements for the collection and distribution of data, and the training of field workers to undertake primary research in arid regions. The latter task is particularly urgent, in view of the general shortage of research workers.

Whereas the RAINFALL year 1950-51 was one of the driest years on record in Israel (cf. *Israel Explor. Journ.*, 2, 1952, pp. 140-1), the annual totals for the years 1951-52 were through most of the country above average,—at some stations to a considerable degree.

The beginning of the Rainfall Season 1951-52 looked rather unpromising. Pessimistic observers even feared a recurrence of the drought of 1950-51, to repeat the dreaded memory of 1931-32, 1932-33, or, to a lesser extent, 1875-76, 1876-77. All these fears were reversed by the excessively heavy rainfall pouring out over the country from 13 to 23 December 1951, almost without interruption. During these eleven days many stations recorded more than 300 mm. of rain. The highest records were obtained in the Coastal Plain south of Tel Aviv with the maximum of 569 mm. (22.42 inches) at Beit 'Oved. Highest daily amounts were recorded on December 20th: Lydda Airport 148.4 mm., Beit 'Oved 172.5 mm., Rishon le-Zion 174.3 mm. (6.86 inches). The comparative table shows that rainfall at many stations during these eleven days exceeded the total annual amount recorded during the preceding year 1950-51! This heavy rainfall occurred with a prolonged inflow of Polar air-masses into the eastern Mediterranean arriving on a northerly trajectory from Russia.

As may be seen from the table some stations received within these eleven days amounts equal to their total annual average or more. Although last December's figures were particularly excessive, concentrated high rainfall during short periods is by no means exceptional in Israel. Comparative cases occurred e.g. on 5.-9.11.1938 and 18.-29.12.1949. A few comparative figures are illuminating:—

Table 1

THREE EXCESSIVE RAINFALLS IN ISRAEL

A: *Rainfall during period indicated.* B: *% of seasonal total.* C: *% of annual average. Figures in mm. Figures by courtesy of Director, Israel Meteorological Service.*

Station	5.-9.11.1938			18.-29.12.1949			Total 1950-51	13.-23.12.1951		
	A	B	C	A	B	C		A	B	C
Coastal Plain										
Natanya	313	47	67	408	50	88	288	262	37	56
Ramat ha-Sharon	267	51	56	466	48	99	320	284	44	60
Tel Aviv, ha-Qirya	414	50	80	413	51	80	327	296	45	58
Lydda Airport	339	39	67	252	40	50	304	452	57	90
Neser	247	33	49	217	36	43	327	538	58	107
Beit 'Oved				120	30	25	277	569	60	118
Rehovot	250	34	50	193	32	39	286	496	56	100
Mountains										
Qiryat 'Anavim	196	23	26	196	29	27	389	474	48	64
Jerusalem, Romema	202	30	32	168	30	27	280	358	57	58
Jordan Valley										
Tiberias	131	25	29	146	35	32	211	197	36	43
Beit Zer'a	134	27	34	154	33	40	212			

The heavy rainfall of December 1951 caused large-scale flooding and much damage to vegetables and citrus plantations, roads and housing in the Coastal Plain, as had occurred during the earlier cases mentioned. It furthermore brought about considerable soil erosion throughout the country.

Intermittent rainfall continued until the middle of January. The second part of that month was rainless, a rather exceptional occurrence. The season came to an early end in March, as very little rain fell in April and almost none in May.

Table 2 (p. 252) contains selected Annual Rainfall Totals for 1951-52.

The ISRAEL DEPARTMENT OF ANTIQUITIES profited from the seasonal interruption of excavations in the winter to hold a series of courses in the archaeology (theoretical and practical) of Israel, for its excavation assistants. The lectures, which included history, history of art, etc. were given by members of the Department and lecturers from the University and other learned institutions. The whole course comprised 180 hours of lectures and three excursions; it lasted from January to March, and concluded with examinations.

Further discoveries were made in the excavations of the ISRAEL DEPARTMENT OF ANTIQUITIES at *Beth Yerah*, under the direction of Mr. P. Bar-Adon. Two city walls that once surrounded the ancient town were excavated for a length of about sixty metres.

Table 2

Station	Rainfall 1951-52	
	Amount mm.	% of annual average
Coastal Plain N to S		
Nahariya	798	112
Haifa, Mt. Carmel	608	82
Caesarea, S'dot Yam	730	119
Tel Aviv, ha-Qirya	662	129
Beer Tuvya	735	150
Mountain Region		
Safad, Mt. Kana'an	932	126
'Affule	560	120
Jerusalem, Romema	837	135
Jordan Valley		
Dafne	625	106
Tiberias	554	121
Negev		
Beersheba	243	107
Mashabim	134	118
Nahal Paran	44	—
Eilat	26	118

(Cf. *Annual Rainfall Summary, 1951/52.* Israel Meteorological Service, Ser. B, No. 5/R. ha-Qirya, 1952.)

One wall is built of mud bricks : it is about ten meters wide and five meters high and belongs to the second phase of the Early Bronze Age (2900-2600 B.C.). Its gate had a foundation of stones, over which were laid the unburnt bricks. The door socket of the gate was found *in situ.*— The second wall is made of stone, in the form of rough boulders laid in irregular rows. Its width is about five metres and its extant height three and a half metres; it belongs to the first phase of the Middle Bronze Age (2100-1900 B.C.). It includes the remains of a rounded tower near the lake and of rectangular towers flanking the city gate. Above the stone wall were three courses of unburnt bricks, remains of the brick superstructure of the wall. Near-by were several buildings separated from the wall by a narrow street paved with stone pebbles and connected with a square, also paved in the same manner. Several graves were unearthed, dating from the second phase of the Middle Bronze Age (18th cent. B.C.). The dead were buried in a crouched position, and the tombs yielded in addition to pottery, hundreds of beads, bronze pins and other objects. Several grain barns and ovens of the Persian Period were discovered, together with weapons, etc. A house of the Hellenistic Period, built of terre pisée was also found, its walls covered with fine mortar and decorated with geometric designs in various colours. In the mortar were incised lines imitating stone panels. Remains of stone walls from the Roman Period were found above the Hellenistic level. The small finds include the head of an ivory figurine of a bull, an ivory comb, a figurine of a recumbent lion, etc.

Dr. M. Stekelis conducted a third season's excavation at *Sha'ar ha-Golan* this autumn on behalf of the ISRAEL EXPLORATION SOCIETY, with the aid of a grant from the American Fund for Israel Institutions (cf. *Israel Explor. Journ.*, 1, 1950-51, p. 248). The excavation confirmed the following stratigraphical sequence:

Early Bronze Age IV
Earlier stratum of Early Bronze Age
River deposit
Neolithic
Virgin soil (clay and river gravels).

The Early Bronze Age IV was represented by the foundations of a building consisting of three rooms and an inner court,

in which a silo-jar with two envelope-ledge handles was found, as well as various potsherds and flints. Under this building remains of foundations of another building were found, with potsherds of an earlier stage of the Early Bronze Age. Below this stratum was a river deposit of gravel, sand and loam, over 70 cm. in thickness, representing an old course of the River Yarmuk. Below this deposit were found 40 cm. of Neolithic strata, representing the Yarmukian culture (cf. *Israel Explor. Journ.*, 1, 1950-51, pp. 1-19). A pit-dwelling of oval shape was uncovered, with an oval fireplace in its centre. The dwelling was built of stones in two layers separated by a layer of loam and sand. On the fireplace was found a skeleton which had been buried there; it was in a bad state of preservation. The grave erected above the skeleton was conical in shape and was built of sixty stones, arranged in five courses to a height of nearly one metre. On the floor of the pit-dwelling and around the grave were found flint implements, animal bones, pottery with herring-bone ornaments, a female figurine, and many carved stones. The stratigraphy of the site was verified in an old trench of 600 m. length, where the same stratigraphical sequence was observed.

M. Jean Perrot has recently undertaken researches on behalf of the CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE on the banks of the *Pattish Valley*, 13 km. west of Beersheba. He uncovered the remains of an establishment dating back to the end of the Chalcolitic Period.

The excavations revealed brick-walls on pebble foundations. Foundations of huts were uncovered with a diameter of approximately 1.50 m.; fireplaces and silos (?) deeply dug into the floor have also been found. Stone implements are already rare, and are represented principally by sickle-blades, polished axes and scrapers. Pottery appears in abundance, apparently made on the spot and revealing a certain number of new forms. This pottery differs from that known in the north of the country at the same period, especially noticeable being the absence of horizontal lug handles and relief-decorations. The latter are generally replaced by painted decorations in the form of original geometrical motifs.

This settlement of the Pattish Valley (as well as other contemporary sites discovered near Beersheba by Mr. D. Allon) is evidence of the very early occupation of this region by a population of shepherds and farmers; it connects the sites of the B'sor Valley with those of Umm Qatafa, Ghassul, Tel Aviv (Jabotinsky Road), B'nei-B'raq and Hadera—all of which represent the culture of Southern Palestine before the Bronze Age.

The second Meeting of the Archaeological Advisory Board of the ISRAEL DEPARTMENT OF ANTIQUITIES took place on 21 April 1952. In the afternoon of the same day the Minister of Education and Culture, Prof. B.-Z. Dinaburg, opened an extension of the Permanent Exhibition of Antiquities, which shows acquisitions from recent excavations and other sources.

The ISRAEL EXPLORATION SOCIETY held its Eighth Annual Convention at Beth Yerah on the shores of Lake Tiberias on October

5-9, 1952. (Cf. *Israel Explor. Journ.*, 1, 1950-51, p. 124.) Prof. B. Mazar-Maisler, Chairman of the Society, opened the inaugural meeting, which was addressed by Prof. Nelson Glueck (President, Hebrew Union College, Cincinnati) on *The Archaeological Survey of the Jordan Valley.*

For the first time the convention was held in two separate sections: (A) archaeology and history, and (B) geography and science. In section A the following lectures were delivered: M. Stekelis: *Early Man in the Jordan Valley,* J. Perrot: *The Beginnings of Permanent Settlements in Palestine,* J. Leibovitch: *Palestine in Egyptian Archaeology,* Ruth B. K. Amiran: *Khirbet Kerak Ware,* N. Avigad: *Some Architectural Problems from the Period of the Second Temple,* A. Biran: *Names of the Land* (from the work of the Government Names Commission), Y. Braslawski: *The Stoppage of the Jordan at the Time of Joshua,* Y. Aharoni: *Towns of Naphtali in the Jordan Valley,* M. Schwabe: *Inscriptions from the Jordan Valley,* J. W. Hirschberg: *Tradition and Research in the Exploration of Palestine,* Y. Ben-Zvi: *On the Study of Oriental Communities.*

Section B heard the following lectures: D. H. K. Amiran: *Changes in the Landscape of Palestine since 1800,* Y. Schattner: *The Jordan River,* D. Ashbel: *The Climate of the Jordan Valley,* N. Shalem: *Floods in the Region of Lake Tiberias,* Y. Karmon: *The Physical and Cultural Development of the Huleh Basin,* W. C. Lowdermilk: *The Tasks of Soil Conservation,* N. Gil: *Soil Conservation in Israel,* Y. Neumann: *On some Research Projects of the Meteorological Service,* A. Shulov: *Locusts in the Near East,* A. H. Oren: *Oceanographical Research along the Coast of Israel;* Mr. A. Shisha read a paper by Y. Elster on *Recent Developments in Survey Work in Israel.*

A joint meeting of both sections was addressed by the Minister of Education and Culture, Prof. B.-Z. Dinaburg, and heard lectures by Prof. B. Mazar-Maisler on *The Early History of the Jordan Valley,* by Prof. H. G. Güterbock on *Recent Excavations at Boghazköy, Turkey,* by Mr. S. Yeivin on *Problems of Archaeological Research in the Near East,* and by Prof. P. Delougaz (of the Oriental Institute, University of Chicago) on *The Beginnings of Mesopotamian Civilization.*

Two field trips gave members of the Convention the opportunity to visit the ancient synagogues at Chorazin, K'far Nahum (Capernaum), and Beth Alpha, the palace at Kh. Minya, the excavations at Beth Shan, and Beth She'arim. Members also visited the Museum of Prehistoric Archaeology at Sha'ar ha-Golan and the one at Alumot, which was officially opened on this occasion; the regional museum, Beth Sturman at Ein Harod—Tel Yosef was also visited. P. Bar-Adon, with the assistance of other archaeologists, explained the excavations at Beth Yerah in the field.

The Convention coincided with the fortieth anniversary of the Israel Exploration Society. This was celebrated by a special session and concert in the amphitheatre at 'Ein Gev.

The Convention concluded with an excursion to the Huleh Valley, which included a visit to the reclamation works at present in progress. J. Weitz, on behalf of the Jewish National Fund gave an introductory talk on the aims and problems of the reclamation scheme.

Members of the Israel Exploration Society interested in prehistoric archaeology have formed a PREHISTORIC SECTION within the society. The first meeting is scheduled to take place in Jerusalem in March, 1953, and a typological exhibition is being prepared for the occasion.

The ISRAEL NUMISMATIC SOCIETY held its Second Conference on May 16-17, 1952. The meeting was devoted to papers on the problems of the ancient city coinage of Palestine. The papers read were: *The coins of Scythopolis* (by the late Stella Ben-Dor); *Mount Gerizim on the coins of Neapolis* (Prof. A. Reifenberg); *The coinage of Tiberias* (A. Kindler); *The tetradrachms of Ascalon* (M. Kissin); *The coins of Caesarea* (L. Kadman); *The small coins of Caesarea* (H. Hamburger). A numismatic exhibition and an exhibition of numismatic books in memory of the late Stella Ben-Dor were held on the same occasion.

Obituary. The Editors regret to announce the death at the age of fifty-three of M. René NEUVILLE, Consul General of France in Jerusalem. M. Neuville was born at Gibraltar and entered the French Diplomatic Service in 1921. He continued in the Service throughout his life, with the exception of certain war years when he was suspended by the Vichy authorities for his Gaullist sympathies. He served for many years in Jerusalem as Consul, and later for a second term as Consul-General. M. Neuville's intellectual interests were very wide, ranging from Egyptology to the history of the French Consulate-General in Jerusalem, but he achieved distinction preeminently as a prehistorian. His excavations included that of Jebel Qafze near Nazareth (with Dr. M. Stekelis), and several caves in the Wadi Khareitun in the Judaean Desert. His publications include: Notes de préhistoire palestinienne, *Journ. Pal. Orient. Soc.*, 10-11, 1930-31, Le préhistorique de Palestine, *Rev. bibl.*, 1934, and several studies in Moroccan prehistory. His latest work (written in collaboration with others) was entitled *Le Paléolithique et le Mésolithique du désert de Judée*, 1951, and embraces the results of many years of research in that region. M. Neuville served as President of the Palestine Oriental Society and as a member of the Archaeological Advisory Board of the Mandatory Government.

Personal News. Prof. B. Mazar-Maisler, a member of the Board of Editors of this *Journal*, has been elected Rector of the Hebrew University for the academic years 1952-53, 1953-54. — Prof. M. Evenari has been elected Dean of the Faculty of Mathematics and Science for the same period. — Prof. N. H. Tur-Sinai has replaced Prof. Mazar-Maisler as Head of the Institute of Jewish Studies of the Hebrew University.

A: Artemisietum Herbae albae (Artemisietea). Mt. Ramon (Negev).

B: Association of Artemisia monosperma—Convolvulus lanatus (Retametea). Tamarix articulata planted. Negev.

C: Suaedetum palaestinae (Suaedetea). North shore of Dead Sea.

D: Tamaricetum maris mortui (Suaedetea). North shore of Dead Sea.

PLATE 14

A: Hammada bearing vegetation in beds of wadis only. Southern Transjordan.

B: Suaedetum asphalticae (Anabasidetea). Judaean Desert.

C: Zygophylletum dumosi (Anabasidetea). Central Negev.

A: Haloxyletum persici (Haloxyletea). Araba.

B: A group of Dum-palms (Hyphaene thebaica) near the Gulf of Elath.

C: Acacietum tortilidis anabasidetosum (Acacietea Raddianae). Araba.

PLATE 16

A: Figurine of a bending woman.

B: Figurine with human face.

TWO MORE YARMUKIAN FIGURINES

A: Early Bronze building: General view, looking NE. Pipeline of Roman bath traversing the surface.

B: Roman bath: The pool in the hall.

A: Details of Early Bronze building and paved street.

B: Staircase near Early Bronze building.

A: Early Bronze building: Court-yard paved with pebbles.

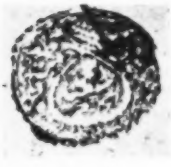
B: Pottery figurines.

PLATE 20

OTTOMAN RULE
IN JERUSALEM

A: Court decision
from 1537 →

B: Detail of *jizya-ticket*, cf. p. 244, fig. 1.



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